A PROPOSED SOLUTION FOR P Vs NP PROBLEM
A THESIS SUBMITTED FOR THE DEGREE IN ARTIFICIAL INTELLIGENCE

PART – 1

LONDON MATHEMATICAL SOCIETY

Submitted to

Nalini Anantharaman
Timothy Browning*

Submitted by

EKTA SINGH, DIRECTOR
NYAYSANGAT FOUNDATION

DATE - 04/01/2021

AUTHOR NOTE :

DECLARATION

I confirm that this is my own work and the use of all material from other sources has been properly and fully acknowledged.

Thank You,

Ekta Singh,

Director

NYAYSANGAT FOUNDATION

ACKNOWLEDGEMENT

I am deeply grateful for “INTEGREON MANAGED SOLUTIONS, EXL SERVICES, THOMSON REUTERS PVT. LTD and VIRTUAL EMPLOYEE, PVT. LTD

Thanks to Integreon Organization for Manual Extraction work on Excel Worksheet. Here employees are also working on litigation solution based on E – Discovery. E – Discovery is the best example of Artificial Intelligence.

Finally, to my family, thank you so much for your unconditional love and support.

LORD GANESHA, LORD SHIVA, GODDESS KALI, GODDESS SARASWATI, GODDESS LAXMI, LORD VISHNU. His Divine Providence willed that my journey be shaped with the support of all these Lord and others who prayed for me. I owe you all my prayers.

"Special Thanks to Dr. Gunjan Bansal. I greatly appreciate her for generous time. She is always ready to help with a smile".

Thank you.

EKTA SINGH,

DIRECTOR

NYAYSANGAT FOUNDATION

DISCLAIMER

The views and opinions expressed in this thesis are the author's own and the facts are reported by her which have been verified to the extent possible, and the publisher are not in any way liable for the same.

Thesis is solely dedicated for kids and youth spiritual development for society betterment.

International Journal of Advances in Engineering Research

e-ISSN: 2231-5152; p-ISSN: 2249-1796

TABLE OF CONTENT

e-ISSN: 2231-5152; p-ISSN: 2249-1796

International Journal of Advances in Engineering Research

e-ISSN: 2231-5152; p-ISSN: 2249-1796

ABSTRACT

PROBLEM STATEMENT

Does P = NP

AUTHOR IS PROVIDING EASIEST WAY TO SOLVE THIS PROBLEM

Game theory is the study of mathematical models of strategic interaction among rational decision-makers. It has applications in all fields of social science, as well as in logic, systems science and computer science. Originally, it addressed zero-sum games, in which each participant's gains or losses are exactly balanced by those of the other participants. In the 21st century, game theory applies to a wide range of behavioral relations, and is now an umbrella term for the science of logical decision making in humans, animals, and computers. The purpose of game theory is to investigate why we can see a specific behavior or pattern in a given interaction.

ARTIFICIAL INTELLIGENCE –

Artificial intelligence is an area of computer science that emphasizes the creation of intelligent machines that work and reacts like humans. Some of the activities computers with artificial intelligence are designed for include: Problem Solving.

An ability to identify patterns in streams of inputs, whereas learning with adequate supervision involves classification and numerical regressions.

Machine learning is also a core part of Artificial Intelligence. Mathematical analysis of machine learning algorithms and their performance is a well – defined branch of theoretical computer science often referred to as computational learning theory.

Robotics is also a major field related to AI. Robots require intelligence to handle tasks such as object manipulation and navigation, along with sub – problems of localization, motion planning and mapping.

The ideal characteristics of artificial intelligence are its ability to rationalize and take actions that have the best chance of achieving a specific goal.

The applications for intelligence are endless. The technology can be applied to many different sectors and industries.

Artificial Intelligence can be divided into two different categories: weak and strong. Weak artificial intelligence embodies a system designed to carry out one particular job. Weak AI systems include video games such as the chess example, tic - tac –toe. calculator app, an alarm clock app, a to-do list, student or customer management system, etc.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

INTRODUCTION

AUTHOR IS PROVIDING EASIEST WAY TO SOLVE THIS PROBLEM

This is a paper that proposed a possible solution of The P v NP Problem. There are many problems proposed to computer scientists that have been thought to be too difficult for computers to solve quickly. In fact, perhaps the most fundamental question in computer science is to find if certain types of problems, collectively known as the class NP, can be solved quickly by a computer. If so, a world of opportunities would open up, and many new problems that were supposed to be almost impossible to solve could be solved quickly. This paper attempts to provide a proof that they can be solved quickly, and also shows a way to do it..

NP – complete is a subset of NP, the set of all decision problems whose solutions can be verified in polynomial time; NP may be equivalently defined as the set of decision problems solved in polynomial time on a machine.

The P v NP problem is a major unsolved problem in computer science; it asks whether every problem in computer science whose solution can be quickly verified can also be solved quickly.

The Problem – The P v NP problem asks whether every problem whose solution can be quickly verified by a computer can also be quickly solved by a computer.

So let’s figure out what we mean by P and NP.

P problems are easily solved by computers and NP problems are not easily solvable, but if you present a potential solution it’s easy to verify whether it’s correct or not.

Suppose that you are organizing housing accommodations for a group of four hundred university students. Space is limited and only one hundred of the students will receive places in the dormitory. To complicate matters, the Dean has provided you with a list of pairs of incompatible students, and requested that no pair from this list appear in your final choice. This is an example of what computer scientists call an NP-problem, since it is easy to check if a given choice of one hundred students proposed by a coworker is satisfactory (i.e., no pair taken from your coworker's list also appears on the list from the Dean's office), however the task of generating such a list from scratch seems to be so hard as to be completely impractical. Indeed, the total number of ways of choosing one hundred students from the four hundred applicants is greater than the number of atoms in the known universe! Thus, no future civilization could ever hope to build a supercomputer capable of solving the problem by brute force; that is, by checking every possible combination of 100 students. However, this apparent difficulty may only reflect the lack of ingenuity of your programmer. In fact, one of the outstanding problems in computer science is determining whether questions exist whose answer can be quickly checked, but which require an impossibly long time to solve by any direct procedure. Problems like the one listed above certainly seem to be of this kind, but so far no one has managed to prove that any of them really are so hard as they appear, i.e., that there really is no feasible way to generate an answer with the help of a computer. Stephen Cook and Leonid Levin formulated the P (i.e., easy to find) versus NP (i.e., easy to check) problem independently in 1971.

Problem Statement

Does P = NP?

e-ISSN: 2231-5152; p-ISSN: 2249-1796

ALGORITHM

In mathematics and computer science, an algorithm is a sequence of instructions, typically to solve a class of problems or perform a computation. Algorithms are unambiguous specifications for performing calculation, data processing, automated reasoning, and other tasks.

UI components are playing big role to solve it, because it provides widgets & helpers to make your app not only easy but delightful to use like –Animation & Transitions, Auto, Emoji Emotions, **Algorithms and data structures are an integral part of data science.**

IN MATHEMATICS

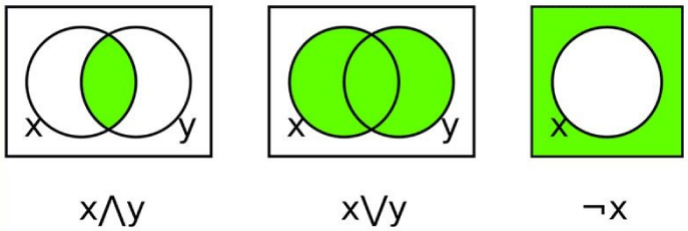
I. BOOLEAN ALGEBRA

In mathematics and mathematical logic, **Boolean algebra** is the branch of algebra in which the values of the variables are the truth values true and false, usually denoted 1 and 0, respectively. Instead of elementary algebra, where the values of the variables are numbers and the prime operations are addition and multiplication, the main operations of Boolean algebra are the conjunction (and) denoted as ∧, the disjunction (or) denoted as ∨, and the negation (not) denoted as ¬. It is thus formalism for describing logical operations, in the same way that elementary algebra describes numerical operations. Boolean algebra has been fundamental in the development of digital electronics, and is provided for in all modern programming languages. It is also used in set theory and statistics

BOOLEAN ALGEBRA OPERATIONS

The basic operations of Boolean algebra are as follows:

- Conjunction or AND operation
- Disjunction or OR operation
- Negation or Not operation



e-ISSN: 2231-5152; p-ISSN: 2249-1796

Below is the table defining the symbols for all three basic operations.

Operator	**Symbol**	**Precedence**
NOT	‘ (or) ¬	Highest
AND	. (or) ∧	Middle
OR	+ (or) ∨	Lowest

Suppose A and B are two boolean variables, then we can define the three operations as;

- A conjunction B or A AND B, satisfies A ∧ B = True, if A = B = True or else A ∧ B = False.
- A disjunction B or A OR B, satisfies A ∨ B = False, if A = B = False, else A ∨ B = True.
- Negation A or ¬A satisfies ¬A = False, if A = True and ¬A = True if A = False

Similarly,

If we express P V NP in the above operations in a truth table, we get;

P	NP	P ∧ NP	P ∨ NP
True	True	True	True
True	False	False	True
False	True	False	True
False	False	False	False

e-ISSN: 2231-5152; p-ISSN: 2249-1796

II.TRUTH TABLE

A **truth table** is a mathematical table used in logic—specifically in connection with Boolean algebra, boolean functions, and propositional calculus—which sets out the functional values of logical expressions on each of their functional arguments, that is, for each combination of values taken by their logical variables. In particular, truth tables can be used to show whether a propositional expression is true for all legitimate input values, that is, logically valid.

PRINCIPLES FOR THE CONSTRUCTION OF TRUTH TABLES ARE EXPLAINED AND ILLUSTRATED.

i. How to construct the guide columns:

   a. Write out the number of variables (corresponding to the number of statements) in alphabetical order.

   b. The number of lines needed is 2^n where n is the number of variables. (*E. g.*, with three variables, $2^3 = 8$).

   c. Start in the right-hand column and alternate **T**'s and **F**'s until you run out of lines.

   d. Then move left to the next column and alternate pairs of **T**'s and **F**'s until you run out of lines.

   e. Then continue to the next left-hand column and double the numbers of **T**'s and **F**'s until completed.

ii. As check that the guide columns were done correctly:

   1. The first horizonal line will be all **T**'s.
   2. The last horizonal line will be all **F**'s.
   3. The left-most column will be evenly divided; the first half all **T**'s and the second half all **F**'s.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

EXAMPLE:

HOW TO CONSTRUCT A TRUTH TABLE FOR P ∨ (Q ∨ R)

	Line No. ↓	**I, A** variables in alphabetical order ↓				
III, A First line all T →		**p**	**q**	**r**	**q ∨ r**	**p ∨ (q ∨ r)**
	1	T	T	T	T	T
	2	T	T	F	T	T
I, B number of lines = 2^n →	3	T	F	T	T	T
	4	T	F	F	F	T
	5	F	T	T	T	T
III, D half T's half F's	6	F	T	F	T	T
	7	F	F	T	T	T
	8	F	F	F	F	F
	III, B last line all F	↑ **I, E** alternate double of previous T and F	↑ **I, D** alternate pairs of T and F	↑ **I, C** alternate T and F		

When we consider -

e-ISSN: 2231-5152; p-ISSN: 2249-1796

III. LINEAR EQUATIONS IN ONE VARIABLE

Things to remember

a) We will only solve for unknown variable „x"
b) Pay attention to „+" and „-„ signs when solving equations
c) Both sides of a linear equation are equal to each other

Linear Equations in One Variable is an equation which can be written in the form of ax+b = 0, where a and b are real number constants and a is not equal to 0.

Example

x+7 = 12

Equation is a mathematical sentence indicating that two expressions are equal. The symbol "=" is used to indicate equality.

Example -

2x + 5 = 9 is a conditional equation

Since its truth or falsity depends on the value of x

Example -

2x +5 = 9 is a conditional equation since its truth or falsity depends on the value of x

1+ 1 = ?

2+9 = 11 is identity equation since both of its sides are identical to the same number 11.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Solution Set of a Linear Equation

Example

$4x + 2 = 10$	this statement is either true of false
If $x = 1$, then $4x + 2 = 10$	is false because $4(1) + 2$ is $\neq 10$
If $x = 2$, then $4x + 2 = 10$	is true because $4(2) + 2 = 10$

A statement of equality of two algebraic expressions, which involve one or more unknown quantities, is known as an equation.

A linear equation is an equation which involves linear polynomials.
A value of the variable which makes the two sides of the equation equal is called the solution of the equation.

Same quantity can be added/subtracted to/from both the sides of an equation without changing the equality.

Both the sides of an equation can be multiplied/divided by the same non-zero number without changing the equality.

IV. IN GEOMETRY

The objects are said to be concentric, when they share the common center. Circles, spheres, regular polyhedra, regular polygons are concentric as they share the same center point. In Euclidean Geometry, two circles that are concentric should have different radii from each other.

Concentric Circle Equations

Let the equation of the circle with centre (-g, -f) and radius $\sqrt{[g^2+f^2-c]}$ be

$x^2 + y^2 + 2gx + 2fy + c = 0$

Therefore, the equation of the circle concentric with the other circle be

$x^2 + y^2 + 2gx + 2fy + c' = 0$

e-ISSN: 2231-5152; p-ISSN: 2249-1796

It is observed that both the equations have the same centre (-g, -f), but they have different radii, where c≠ c'

Similarly, a circle with centre (h, k), and the radius is equal to r, then the equation becomes

$(x – h)^2 + (y – k)^2 = r^2$

Therefore, the **equation of a circle** concentric with the circle is

$\mathbf{(x - h)^2 + (y - k)^2 = r_1^2}$ Where $r \neq r_1$

V. CONGRUENT CIRCLE

Definition of congruence in analytic geometry

In a Euclidean system, congruence is fundamental; it is the counterpart of equality for numbers. In analytic geometry, congruence may be defined intuitively thus: two mappings of figures onto one Cartesian coordinate system are congruent if and only if, for any two points in the first mapping, the Euclidean distance between them is equal to the Euclidean distance between the corresponding points in the second mapping. A more formal definition states that two subsets A and B of Euclidean space $\mathbf{R}^n$ are called congruent if there exists an isometry $f : \mathbf{R}^n \rightarrow \mathbf{R}^n$ (an element of the Euclidean group E(n)) with f(A) = B. Congruence is an equivalence relation.

VI. SET THEORY

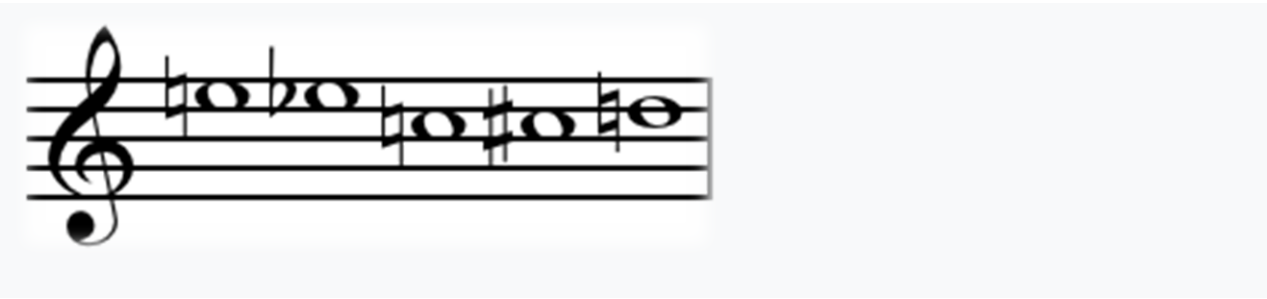
In naive set theory, a set is a collection of objects (called members or elements) that is regarded as being a single object. To indicate that an object x is a member of a set A one writes $x \in A$, while $x \notin A$ indicates that x is not a member of A. A set may be defined by a membership rule (formula) or by listing its members within braces. For example, the set given by the rule "prime numbers less than 10" can also be given by {2, 3, 5, 7}. In principle, any finite set can be defined by an explicit list of its members, but specifying infinite sets requires a rule or pattern to indicate membership; for example, the ellipsis in {0, 1, 2, 3, 4, 5, 6, 7, ...} indicates that the list of natural numbers ℕ goes on forever. The empty (or void, or null) set, symbolized by {} or Ø, contains no elements at all. Nonetheless, it has the status of being a set.

A set A is called a subset of a set B (symbolized by $A \subseteq B$) if all the members of A are also members of B. For example, any set is a subset of itself, and Ø is a subset of any set. If both $A \subseteq B$ and $B \subseteq A$, then A and B have exactly the same members. Part of the set concept is that in this case A = B; that is, A and B are the same set.

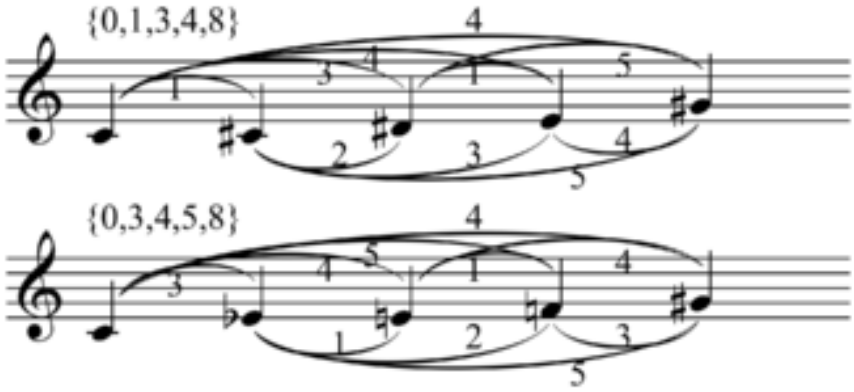
e-ISSN: 2231-5152; p-ISSN: 2249-1796

VII. MUSICAL SET THEORY

A set in music theory, as in mathematics and general parlance, is a collection of objects. In musical contexts the term is traditionally applied most often to collections of pitches or pitch-classes, but theorists have extended its use to other types of musical entities, so that one may speak of sets of durations or timbres, for example.



A set by itself does not necessarily possess any additional structure, such as an ordering or permutation. Nevertheless, it is often musically important to consider sets that are equipped with an order relation (called *segments*); in such contexts, bare sets are often referred to as "unordered", for the sake of emphasis. Two-element sets are called dyads, three-element sets trichords (occasionally "triads", though this is easily confused with the traditional meaning of the word triad). Sets of higher cardinalities are called tetrachords (or tetrads), pentachords (or pentads), hexachords (or hexads), heptachords (heptads or, sometimes, mixing Latin and Greek roots, "septachords"),[5] octachords (octads), nonachords (nonads), decachords (decads), undecachords, and, finally, the dodecachord. A time-point set is a duration set where the distance in time units between attack points, or time-points, is the distance in semitones between pitch classes. Example of Z-relation on two pitch sets analyzable as or derivable from Z17 (Schuijer 2008, 99), with intervals between pitch classes labeled for ease of comparison between the two sets and their common interval vector, 212320.



The fundamental concept of musical set theory is the (musical) set, which is an unordered collection of pitch classes (Rahn 1980, 27). More exactly, a pitch-class set is a numerical representation consisting of distinct integers (i.e., without duplicates) (Forte 1973, 3). The elements of a set may be manifested in music as simultaneous chords, successive tones (as in a melody), or both. Notational conventions vary from author to author, but sets are typically enclosed in curly braces: {} (Rahn 1980, 28), or square brackets: [] (Forte 1973, 3).

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Some theorists use angle brackets [] to denote ordered sequences (Rahn 1980, 21 & 134), while others distinguish ordered sets by separating the numbers with spaces (Forte 1973, 60–61). Thus, one might notate the unordered set of pitch classes 0, 1, and 2 (corresponding in this case to C, C♯, and D) as {0,1,2}. The ordered sequence C-C♯-D would be notated or (0,1,2). Although C is considered zero in this example, this is not always the case. For example, a piece (whether tonal or atonal) with a clear pitch center of F might be most usefully analyzed with F set to zero (in which case {0,1,2} would represent F, F♯ and G. (For the use of numbers to represent notes, see pitch class.)

Though set theorists usually consider sets of equal-tempered pitch classes, it is possible to consider sets of pitches, non-equal-tempered pitch classes, rhythmic onsets, or "beat classes" (Warburton 1988, 148; Cohn 1992, 149).

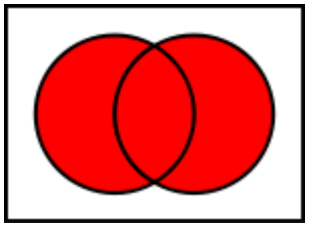
Two-element sets are called dyads, three-element sets trichords (occasionally "triads", though this is easily confused with the traditional meaning of the word triad). Sets of higher cardinalities are called tetrachords (or tetrads), pentachords (or pentads), hexachords (or hexads)

VIII. COMPUTATION IS CALCULATION

Computation is calculation solving, making decision or any task done by computer/calculator/any machine.

Sir John Tenniel's illustration of the Caterpillar for Lewis Carroll's Alice's Adventures in Wonderland is noted for its ambiguous central figure, whose head can be viewed as being a human male's face with a pointed nose and chin, or as being the head end of an actual caterpillar, with the first two right "true" legs visible. In logic and mathematics, or is the truth-functional operator of (inclusive) disjunction, also known as alternation; the or of a set of operands is true if and only if one or more of its operands is true. The logical connective that represents this operator is typically written as ∨ or +.

Or is usually expressed with an infix operator: in mathematics and logic, ∨; in electronics, +; and in most programming languages.



Logical disjunction is an operation on two logical values, typically the values of two propositions, that has a value of false if and only if both of its operands are false. More generally, a disjunction is a logical formula that can have one or more literals separated only by 'or's. A single literal is often considered to be a degenerate disjunction.

The disjunctive identity is false, which is to say that the or of an expression with false has the same value as the original expression. In keeping with the concept of vacuous truth, when disjunction is defined as an

e-ISSN: 2231-5152; p-ISSN: 2249-1796

operator or function of arbitrary, the empty disjunction (OR-ing over an empty set of operands) is generally defined as false. Disjunction is often used for bitwise operations.

Examples:

- 0 or 0 = 0
- 0 or 1 = 1
- 1 or 0 = 1
- 1 or 1 = 1
- 1010 or 1100 = 1110

The or operator can be used to set bits in a bit field to 1, by or-ing the field with a constant field with the relevant bits set to 1. For example, x = x | 0000000001 will force the final bit to 1 while leaving other bits unchanged.

IX. INTEGER (INT)

An integer, in the context of computer programming, is a data type used to represent real numbers that do not have fractional values. The use of integers as variables supports programming in various ways, For instance, a common strategy is to create an integer variable and store some value in it that will influence computations or calculations made within the program. Another core use of an integer data type is represented in code loops such as "while" statements. For Example, a programmer can set up an integer value named "int" where int=1. Code can include the command "int = int+1", which will increase the value incrementally. The programmer can add additional commands for outcomes where the value reaches a certain critical point.

✓ Rule: The sum of any integer and its opposite is equal to zero. Summary: Adding two positive integers always yields a positive sum; adding two negative integers always yields a negative sum. To find the sum of a positive and a negative integer, take the absolute value of each integer and then subtract these values.

✓ An integer is a whole number (not a fraction) that can be positive, negative or zero.

✓ When two integers are added, subtracted, or multiplied, the result is also an integer. However, when one integer is divided into another, the result may be an integer or a fraction. For example, 6 divided by 3 equals 2, which is an integer, but 6 divided by 4 equals 1.5, which contains a fraction. Decimal numbers may either be rounded or truncated to produce an integer result.

✓ Integers can be thought of as discrete, equally spaced points on an infinitely long number line. In the above, non-negative integers are shown in blue and negative integers in red.

✓ 

e-ISSN: 2231-5152; p-ISSN: 2249-1796

X. PYTHON STRINGS

✓ Python is an interpreted, object - oriented, procedure oriented high level programming language with dynamic semantics.

✓ It can be very easily implemented. It is a High-Level Language; one does not need to bother about like memory allocation. It is portable, meaning that you can use it on any platform while writing Python script. Python supported by many platforms like Linux, Windows, FreeBSD, Macintosh, Solaris, OS/2, Amiga, AROS, AS/400, BeOS, OS/390, PlayStation, etc. It supports different programming paradigms like object - oriented and procedure-oriented programming, and it is extensible, meaning that it can invoke C and C++ libraries. The language is used to develop data science algorithms, machine learning algorithms, and IoT projects.

WHAT IS STRING IN PYTHON? A STRING IS A SEQUENCE OF CHARACTERS. A CHARACTER IS SIMPLY A SYMBOL. FOR EXAMPLE, THE ENGLISH LANGUAGE HAS 26 CHARACTERS. COMPUTERS DO NOT DEAL WITH CHARACTERS; THEY DEAL WITH NUMBERS (BINARY). EVEN THOUGH YOU MAY SEE CHARACTERS ON YOUR SCREEN, INTERNALLY IT IS STORED AND MANIPULATED AS A COMBINATION OF 0'S AND 1'S. THIS CONVERSION OF CHARACTER TO A NUMBER IS CALLED ENCODING, AND THE REVERSE PROCESS IS DECODING. ASCII AND UNICODE ARE SOME OF THE POPULAR ENCODING USED.

IN PYTHON, STRING IS A SEQUENCE OF UNICODE CHARACTER. UNICODE WAS INTRODUCED TO INCLUDE EVERY CHARACTER IN ALL LANGUAGES AND BRING UNIFORMITY IN ENCODING. STRINGS CAN BE CREATED BY ENCLOSING CHARACTERS INSIDE A SINGLE QUOTE OR DOUBLE QUOTES. EVEN TRIPLE QUOTES CAN BE USED IN PYTHON BUT GENERALLY USED TO REPRESENT MULTILINE STRINGS AND DOCSTRINGS.

```
# all of the following are equivalent
my_string = 'Hello'
print(my_string)
my_string = "Hello"
print(my_string)
my_string = '''Hello'''
print(my_string)
# triple quotes string can extend multiple lines
my_string = """Hello, welcome to the world of Python"""
print(my_string)
```

When you run the program, the output will be:

```
Hello

Hello

Hello

Hello, welcome to

the world of Python
```

We can access individual characters using indexing and a range of characters using slicing. Index starts from 0. Trying to access a character out of index range will raise an *IndexError*. The index must be an integer. We can't use float or other types, this will result into *TypeError*.

Python allows negative indexing for its sequences. The index of -1 refers to the last item, -2 to the second last item and so on. We can access a range of items in a string by using the slicing operator (colon).

```
1.  str = 'programiz'
2.  print('str = ', str)
3.  #first character
4.  print('str[0] = ', str[0])
5.  #last character
6.  print('str[-1] = ', str[-1])
7.  #slicing 2nd to 5th character
8.  print('str[1:5] = ', str[1:5])
9.  #slicing 6th to 2nd last character
10. print('str[5:-2] = ', str[5:-2])
```

If we try to access index out of the range or use decimal number, we will get errors.

```
1.  # index must be in range
2.  >>> my_string[15]
3.  ...
4.  IndexError: string index out of range
5.
6.  # index must be an integer
7.  >>> my_string[1.5]
8.  ...
9.  TypeError: string indices must be integers
```

10. Python String Operations

There are many operations that can be performed with string which makes it one of the most used datatypes in Python.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

XI. CONCATENATION OF TWO OR MORE STRINGS

Joining of two or more strings into a single one is called concatenation.

The **+** operator does this in Python. Simply writing two string literals together also concatenates them. The ***** operator can be used to repeat the string for a given number of times.

```
str1 = 'Hello'
str2 ='World!'
# using +
print('str1 + str2 = ', str1 + str2)
# using *
print('str1 * 3 =', str1 * 3)
```

Writing two string literals together also concatenates them like **+** operator. If we want to concatenate strings in different lines, we can use parentheses.

```
>>> # two string literals together
>>> 'Hello "World!'
'Hello World!'

>>> # using parentheses
>>> s = ('Hello '
...      'World')
>>> s
'Hello World'
```

ITERATING THROUGH STRING

Using for loop we can iterate through a string. Here is an example to count the number of 'l' in a string.

```
count = 0
for letter in 'Hello World':
if(letter == 'l'):
count += 1
print(count,'letters found')
```

e-ISSN: 2231-5152; p-ISSN: 2249-1796

XII. AMBIGUITY

Ambiguity is a type of meaning in which a phrase statement or resolution is not explicitly defined, making several interpretation plausible. A common aspect of ambiguity is uncertainty. It is thus an attribute of any idea or statement whose intended meaning cannot be definitively resolved according to a rule or process with a finite number of steps.

XIII. LAMBDA CALCULUS

It represents mathematical logic – The idea of functions accepting functions as arguments comes from Lambda Calculus.

- ✓ The Lambda Calculus is the formal foundation on which functional programming is built.
- ✓ The Lambda calculus is a term rewriting system, and a reduction means following a rewrite run
- ✓ The Lambda Calculus does not dictate a specific order of evaluation, so given a Lambda expression where multiple reductions are possible, the **Church - Roser theorem** says that you can pick either one. This gives functional programming language designers quite a lot of freedom to design their evaluation semantics. For Example, in f(g,x), assuming both are pure functions, whether you reduce f or g first are equivalent.

XIV. LOGIC GATES

(Digital Circuits) are the basic building blocks of any digital system. It is an electronic circuit having one or more than one input and the output is based on certain logic. Based on this, logic gates are named as AND gate, OR gate, NOT gate etc.

XV. OUTLINE OF THE PAPER

If you really look today problem will be solved easily by given points

A. **HOME NETWORKING** is the process of interconnecting all of the devices in a home together and with the Internet in general. Home networking is used to establish a home network among the typical computing devices found in homes or for domestic use. It is similar to a standard LAN or WLAN network that is confined within a home/house.

Home networking is primarily used to provide Internet connectivity to consumers and devices. These include computers, laptops, mobile phones, tablets and/or televisions. Generally, home networking can be achieved through the modem device provided by an ISP, which may have support for multiple wired, wireless or both types of connections. All the devices can directly connect to the modem to interconnect with each other and to access the Internet. In the case of a non-networked modem, a wired or wireless switch is attached.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

To enforce security, the modem/switch is configured with a user ID/SSID and password, and each connecting device must specify the correct details to gain network/Internet access. Moreover, for advanced services and centralized management, a home server can also be installed within a home network.

B. Google Docs, Google Map, Google Translator, the Google codebase includes approximately one billion files and has a history of approximately 35 million commits spanning Google‟s entire 18-year existence. The repository contains 86TBa of data, including approximately two billion lines of code in nine million unique source files.

C. By comparison, the Microsoft Windows operating system has roughly 50 million lines of code. No software engineer measures the value of their work in lines of code. In fact, the best - designed programs often have the simplest designs and the fewest lines of code.

D. The number of lines of program code in wonderful metric. It's so easy to measure and almost impossible to interpret. It can be used as a measure of complexity or productivity.

E. As an aside, a good programmer should want to subtract lines of code

F. According to Bill Gates - Measuring Software productivity by lines of code is like measuring progress on an airplane by how much it weighs.

G. WIBRO - WIRELESS BROADBAND is a wireless broadband Internet technology being developed by the Korean telecoms industry. WIBRO is the Korean Service name for IEEE 802.16e (mobile WIMAX) international standard.

H. Worldwide Interoperability for Microwave access is a over long distances in a variety way, from point - to - point links to field mobile cellular type access.

It is based on the IEEE 802.16 standard, which is also Wireless.

I. **GPS (Global Problem Solver)** (Newell & Simon 1961) does not only need to solve the problems but should human thought process. Google Map is example.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

XVI. ARTIFICIAL INTELLIGENCE APPLICATIONS

1. **GOOGLE PREDICTIVE SEARCH ENGINE** -WHEN YOU BEGIN TYPING A SEARCH TERM AND GOOGLE MAKES RECOMMENDATIONS FOR YOU TO CHOOSE FROM, THAT IS AI IN ACTION. SO, PREDICTIVE SEARCHES ARE BASED ON DATA THAT GOOGLE COLLECTS ABOUT YOU, SUCH AS YOUR BROWSER HISTORY, YOUR LOCATIONS, YOUR AGE, AND OTHER PERSONAL DETAILS. SO, BY USING AI, GOOGLE ATTEMPTS TO GUESS WHAT YOU MIGHT BE TRYING TO FIND. NOW BEHIND THIS THERE IS A LOT OF NATURAL LANGUAGE PROCESSING, DEEP LEARNING, AND MACHINE LEARNING INVOLVED. IT IS NOT EASY TO CREATE SEARCH ENGINE BUT THE LOGIC BEHIND IS ARTIFICIAL INTELLIGENCE.

2. **J.P. MORGAN**

J.P. MORGAN CHASE'S CONTRACT INTELLIGENCE PLATFORM (COIN) –

PLATFORM USES AI, MACHINE LEARNING, AND IMAGE RECOGNITION SOFTWARE TO ANALYZE LEGAL DOCUMENTS. MANUALLY REVIEWING AROUND12, 000 AGREEMENTS TOTAL OVER 36,000 HOURS BUT AS SOON AS THIS TASK WAS REPLACED BY AI MACHINE, IT WAS ABLE TO DO THIS IN A MATTER OF SECONDS THAT IS THE DIFFERENCE BETWEEN AI AND MANUAL HUMAN WORK. EVEN THOUGH AI CANNOT THINK AND REASON LIKE HUMANS, BUT THEIR COMPUTATIONAL POWER IS VERY STRONG COMPARED TO HUMANS BECAUSE THE MACHINE LEARNING ALGORITHM, DEEP LEARNING CONCEPTS AND NATURAL LANGUAGE PROCESSING, AI HAS REACHED A STAGE WHEREIN IT CAN COMPUTE THE MOST COMPLEX TO COMPLEX PROBLEM IN A MATTER OF SECONDS.

3. **IBM WATSON**

HEALTHCARE ORGANIZATION -

Health care Organizations use IBM AI (WATSON) technology for medical diagnosis.

IBM has developed AI software, specifically for medicine.

More than 230 health care organizations use IBM AI technology, which is IBM WATSON, IBM WATSON technology was able to cross reference 20 million oncology records quickly and correctly diagnose a rare leukemia condition in a patient. So, it basically went through 20 million records.

4. **GOOGLE'S EYE DOCTOR** -

GOOGLE'S AI EYE DOCTOR can examine retina scans and identify a condition called diabetic retinopathy.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

5. FACEBOOK

In SOCIAL MEDIA PLATFORM like FACEBOOK, AI is used FOR FACE VERIFICATION wherein you make use of MACHINE LEARNING and DEEP LEARNING concept in order to detect facial features and tag your friends. All the auto tagging feature that you see in FACEBOOK, behind that there is MACHINE LEARNING, DEEP LEARNING, and NEURAL NETWORKS. There is only AI behind it. The entire social media platform like INSTAGRAM, FACEBOOK, TWITTER, they heavily rely on AI.

6. **TWITTER**'s AI which is being used to identify any sort of hate speech and terroristic language in tweets. So again, it makes use of MACHINE LEARNING, DEEP LEARNING, and NATURAL LANGUAGE PROCESSING in order to filter out any offensive or any reportable content. The company discovered and banned 300,000 terrorist linked accounts, 95% of which were found by non - human, artificially intelligent machines.

VIRTUAL ASSISTANT

7. **GOOGLE ASSISTANT** - We have virtual assistants like Siri, Alexa. Newly released **"**The Google Duplex**"** not only responds to calls and book appointments for you, it also adds a human touch. So it adds human filters and all of that. It makes it sound very realistic. It is actually very hard to distinguish between human and AI speaking over the phone.

8. **TESLA SELF DRIVING CARS** – AI is famous for self driving cars so, AI implements computer vision, image detection, deep learning, in order to build cars that can automatically detect any objects or any obstacles and drive around without human intervention. So these are fully automated self – driving cars.

Tesla Self Driving Cars "robot taxi version" one that can ferry passengers without anyone behind the wheel, drive without any human intervention. A lot of tech giant companies like Google, Tesla, Facebook, all of these data – driven companies. Netflix also makes use of AI.

Even though there are examples of AlphaGo Zero which defeated AlphaGo in the game of Go. AlphaGo Zero basically learned in a span of four months. It learned on its own without any human intervention.

9. NETFLIX - With the help of AI and MACHINE LEARNING, Netflix has developed a personalized movie recommendation for each of its users. So if each of you opened up NETFLIX and if you look at the type of movies that are recommended to you, they are different. This is because NETFLIX studies each user's personal details, and tries to understand what each user is interested in and what sort of movie patterns each user has, and then it recommends movies to them. So NETFLIX uses the watching history of other users with similar taste to recommend what you may be most interested in watching next, so that you can stay engaged and continue your monthly subscription. Also, there is a known fact over 75% of what you watch is recommended by Netflix. So their recommendation engine is brilliant. And the logic behind their recommendation engine AI and MACHINE LEARNING

10. Understanding data and extracting patterns manually takes a lot time. It will take several days for us to extract any useful information from data. But if you use machine learning algorithms,

e-ISSN: 2231-5152; p-ISSN: 2249-1796

you can perform similar computations in less than a second. Another reason is we need to solve complex problems. So from detecting the genes linked to the deadly so from detection the genes linked to the deadly ALS disease, to building self - driving cars, MACHINE LEARNING can be used to solve the most complex problems.

MACHINE LEARNING is subset of AI which provides machines the ability to learn automatically and improve with experience without being explicitly programmed to do so.

11. SPAM FILTERING -.

If you open up your inbox right now, you will notice that there are separate sections.
For Example, we have primary section, social section, and all of that. Gmail has a separate section called the spam mails also. So, what Gmail does is it makes use of concepts of AI and MACHINE LEARNING algorithms to classify emails as spam and non - spam. Many times certain words or phrases are frequently used in spam emails. If you notice your spam emails, they have words like lottery, earn, and full refund. All of this denotes that the email is more likely to be a spam one. So such words and correlations are understood by using MACHINE LEARNING AND NATURAL LANGUAGE PROCESSING and a few other aspects of AI

12. **BIOMETRIC ATTENDANCE** where you trained the machine and after couple of inputs of your biometric identity beat your thumb your iris or yellow or anything once trained machine gun validate your future input

In a sense, ARTIFICIAL INTELLIGENCE is a technique of getting machines to work and behave like humans. In the rest past, ARTIFICIAL INTELLIGENCE has been able to accomplish this by creating machines and robots that have been used in wide range of fields, including health care, robotics, marketing, business analytics, and many more.

XVII. NATURAL LANGUAGE PROCESSING

1. Speech Technologies
- ✓ **Automatic speech recognition (ASR)**
- ✓ **Text- to - speech synthesis (TTS)**
- ✓ **Dialog systems**

2. Language Processing Technologies
- ✓ **Machine Translation**
- ✓ **Information Extraction**
- ✓ **Information Retrieval**
- ✓ **Text classification, Spam filtering.**

XVIII. ROBOTICS

COMPUTER VISION

- Object and character recognition
- Image classification
- Scenario Reconstruction etc.
-

GAME PLAYING

- **Strategy/FPS games, Deep Blue etc.**

LOGIC-BASED PROGRAMS

- Proving Theorems
- Reasoning etc.

XIX. PUBLICATIONS

1. IOSR Journal of Computer Engineering (IOSR-JCE) e-ISSN: 2278-0661,p-ISSN: 2278-8727, Volume 21, Issue 5, Ser. III (Sep - Oct 2019), PP 07-18 www.iosrjournals.org The P vs. NP problem, Author - Ekta Singh, Director Nyaysangat Foundation.

2. IOSR Journal of Applied Chemistry (IOSR-JAC) e-ISSN: 2278-5736.Volume 12, Issue 11 Ser. I (November. 2019), PP 31-39 www.iosrjournals.org DOI: 10.9790/5736-1211013139 www.iosrjournals.org 31 |Page God Is Logically Exist Ekta Singh Director, Nyaysangat Foundation Corresponding Author: Ekta Singh

3. IOSR Journal of Computer Engineering (IOSR-JCE) e-ISSN: 2278-0661,p-ISSN: 2278-8727, Volume 21, Issue 6, Ser. I (Nov - Dec 2019), PP 33-45 www.iosrjournals.org DOI: 10.9790/0661-2106013345 www.iosrjournals.org 33 | Page e=mc2Pr (a) = Time Machine A Light And Music In A New Life Can Be Protected By Meditation And Prayer To Reach The Star For Pride In King"s Kingdom Corresponding Author: Ekta Singh, Director Nyaysangat Foundation

4. IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 15, Issue 6 Ser. VI (Nov - Dec 2019), PP 09-35 www.iosrjournals.org DOI: 10.9790/5728-1506060935 www.iosrjournals.org 9 | Page Pr (a) "Elementary Proof Of The Yang Mills Theory Exists On R4 And Has A Mass Gap Delta > 0" Ekta Singh, Director, Nyaysangat Foundation

5. IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 15, Issue 6 Ser. IV (Nov – Dec 2019), PP 29-46 www.iosrjournals.org DOI: 10.9790/5728-1506042946 www.iosrjournals.org 29 | Page Updated Counter Examples to Riemann Hypothesis Ekta Singh, Director Nyaysangat Foundation Corresponding Author: Ekta Singh, Director

6. International Journal of Universal Science and Engineering http://www.ijuse.in(IJUSE) 2019, Vol. No. 5, Jan-Dec e-ISSN: 2454-759X, p-ISSN: 2454-75811, AN ALTERNATE PROPOSED RESOLUTION OF THE NAVIER - STOKES Ekta Singh, *Director, NYAYSANGAT FOUNDATION*

7. International Journal of Universal Science and Engineering http://www.ijuse.in (IJUSE) 2019, Vol. No. 5, Jan-Dec e-ISSN: 2454-759X, p-ISSN: 2454-7581, E=mc2 Pr (a), AN ELEMENTARY PROOF OF BIRCH AND SWINNERTON DYER CONJECTURE, Ekta Singh, Director, Nyaysangat Foundation.

8. International Journal of Professional Studies http://www.ijps.in (IJPS) 2019, Vol. No. 6, Jan-Jun e-ISSN: 2455-6270; p-ISSN: 2455-7455, E=mc2 Pr (a) **"**PROOF OF THE YANG MILLS THEORY EXISTS ON R4 AND HAS A MASS GAP DELTA > 0**"** Ekta Singh , *Director, NYAYSANGAT FOUNDATION*

9. *EUCLID'S FIFTH POSTULATE, PUBLISHED BY IOSR.*

10. International Journal of Research in Science and Technology http://www.ijrst.com (IJRST) 2020, Vol. No. 10, Issue No. I, Jan-Mar e-ISSN: 2249-0604, p-ISSN: 2454-180X , A POTENTIAL SOLUTION FOR CO-VID-19 Ekta Singh, *Director, Nyaysangat Foundation*

11. Multidisciplinary International Journal http://www.mijournal.in (MIJ) 2019, Vol. No. 5, Jan-Dec e-ISSN: 2454-924X; p-ISSN: 2454-8103, A NEW PROPOSED ELEMENTARY PROOF OF THE PI THAT 7 IS PI EXACT VALUE Ekta Singh, Director, NYAYSANGAT FOUNDATION.

Books:

12. ***GOD IS LOGICALLY EXIST, an hypothesis, Published by: International Research Academic Publications.***
13. ***UNCOVER THE SECRET, An experiment, published by Amazon***
14. ***BHAGAVAD GITA WITH ARTIFICIAL INTELLIGENCE, an experiment, cryptographically designed, published by amazon***
15. ***CNO, An hypothesis, published by amazon***
16. ***HONEYMOON AT WORKPLACE, an experiment, cryptographically designed, Published by amazon***
17. ***WHY SNOWWHITE MET SEVEN DWARFS, Published by: International Research Academic Publications***

18. ***AN MODERN INTRODUCTION OF GOD, Published by: International Research Academic Publications.***
19. ***OHM I LOVE YOU NAMAH, published by Amazon***
20. ***LAWYER COMEOUT FROM THE ROOM, An experiment, cryptographically designed with Hanuman Chalisa***
21. ***A NIGHT IS YOUNG, A PSYCHOLOGICAL ANALYSIS OF HUMAN BEHAVIOUR***

XX. WHAT IS ALGORITHM?

In mathematics and computer science, an algorithm is a sequence of instructions, typically to solve a class of problems or perform a computation. Algorithms are unambiguous specifications for performing calculation, data processing, automated reasoning, and other tasks.

UI components are playing big role to solve it, because it provides widgets & helpers to make your app not only easy but delightful to use like -Animation & Transitions, Auto, Emoji Emotions, **Algorithms and data structures are an integral part of data science.**

XXI. ARTIFICIAL INTELLIGENCE IS A VAST FIELD

Under ARTIFICIAL INTELLIGENCE we have MACHINE LEARNING, we have NLP, we have expert systems, and we have image recognition, object detection and so on. So, AI is sort of a process or it is a methodology in which you make machines, mimic the behavior of human beings.

XXII. MODEL

Model - A model is actually the main component of a machine learning process. So, a model is trained by using a MACHINE LEARNING Algorithm. The difference between an algorithm and a model is that an algorithm maps all the decisions that a model is supposed to take based on the given input in order to get the correct output. So the model will use the machine learning algorithm in order to draw useful insights from the input and give you an outcome that is very precise. That is the ML model.

XXIII. PREDICTOR VARIABLE

Predictor Variable is any feature(s) of the data that can be used to predict the output.

Example - Lets you are trying to predict the height of a person, depending on his weight so here your predictor variable becomes your weight, because you are using the weight of a person to predict the person's height. So your predictor variable becomes your weight.

Response Variables: Response Variable is also known as target variable or the output variable. This is the variable that you are trying to predict by using the predictor variables. So the response variable is the feature or the output variable that needs to be predicted by using the predictor variable(s)

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Training Data: Training and Testing data are terminologies that you will come across very often in a ML process, so training data is basically the data that is used to create the machine learning model. So, basically in a machine learning process, when you feed data into the machine, it will be divided into two parts. So splitting the data into two parts is also known as data splicing. So you will take your input data, you will divide it into two sections. One you will call the training data, and the other you will call the testing data. So then you have something known as the testing data. The training data is basically used to create the machine learning model. The training data helps the model to identify key trends and patterns which are essential to predict the output. Now the testing data is after the model is trained, it must be tested in order to evaluate how accurately it can predict an outcome. Now this is done by using the testing data. So, basically, the training data is used to train the model. The testing data is used to test the efficiency of the model.

XXIV. RAIN PREDICTION (MACHINE LEARNING)

It involves building a Predictive Model that can be used to find a solution for a Problem Statement. In order to solve any problem in ML there are couple of steps we need to follow.

1. **Define Objective**
2. **Data Gathering**
3. **Preparing Data**
4. **Data Exploration**
5. **Building a model**
6. **Model Evaluation**
7. **Predictions**

STEP – 1: DEFINE THE OBJECTIVE OF THE PROBLEM

So basically we look **questions**

a. <u>What are we trying to predict?</u>

In order to understand the ML process, let's assume that you have been given a problem that needs to be solved by using machine learning. So the problem that you need to solve is we need to predict the occurrence of rain in your local area by using ML.**<u>So basically you need to predict the possibility of rain by studying the weather conditions. So what we did here is we basically looked at step number one, which is defining the objective of the problem. Now here you need to answer questions such as what are we trying to predict. Is that output going to be a continuous variable, or is it going to be a discreet variable? These are the kinds of questions that you need to answer in the first step, which is defining the objective of the problem.</u>**

e-ISSN: 2231-5152; p-ISSN: 2249-1796

b. What are the target features?

So here you need to understand what your target variables and what are the different predictor variables that you need in order to predict the outcome. So here our target variable will be basically a variable that can tell us whether it is going to rain or not.

c. What is the input data?

Input data is well need data such as maybe the temperature on a particular day or the humidity level, the precipitation, and so on. So you need to define the objective at this stage. So basically, you have to form an idea of the problem at this stage.

d. What kind of problem are we solving?

Another question that you need to ask yourself is and what kind of problem are you solving.

e. Binary classification, clustering or this is a regression problem?

f. Is this a binary classification problem, or is this a clustering problem, or is this a regression problem?

All you need to understand at step one is you need to define how you are going to solve the problem. You need to understand what sort of data you need to solve the problem, how you are going to approach the problem, what are you trying to predict, what variables you will need in order to predict the outcome, and so on.

STEP 2 – DATA GATHERING: Data such as weather conditions, humidity level, temperature, pressure, etc. are either collected manually or scarped from the web.

In this stage, you must be asking question such as, what kind of data is needed to solve this problem. And is this data available? And if it is available, from where can I get this data and how can I get the data? Data gathering is one of the most times – consuming steps in machine learning process.

If you have to go manually and collect the data, it is going to take a lot of time. But lucky for us, there are a lot of resources online, which were wide data sets. All you need to do is web scraping where you just have to go ahead and download data. One of the websites i can tell you all about is Cargill. So if you are a beginner in Machine Learning, don't worry about data gathering and all of that. All you have to do is go to websites such as Cargill and just download the data set. So coming back to the problem that we are discussing which is predicting the weather, the data needed for weather forecasting includes measures like humidity level, the temperature, the pressure, the locality, whether or not you live in a hill station, such data has to be collected or stored for analysis so all the data is collected during the data gathering stage. This step is followed by data preparation, or also known as data cleaning.

STEP 3 - PREPARING DATA – Data cleaning involves getting rid of inconsistencies in data such as missing value or redundant variables.

So if you are going around collecting data, it almost never in the right format. And even if you are taking data from online resources from any website, even then, the data will require cleaning and preparation. The data is never in the right format. You have to do some sort of preparation in order to make the data ready for analysis. So what you will encounter while cleaning data is you will encounter a lot of inconsistencies in the data set, like

you will encounter some missing values, redundant variables, duplicate values, and all of that. So removing such inconsistencies is very important, because they might lead to any wrongful computations and predictions. So at this stage you can scan the data set for any inconsistencies and you can fix them then and there. So, all the data is collected during the data gathering stage. This step is followed by data preparation, or also known as data cleaning.

- ✓ Transform data into desired format
- ✓ Data cleaning
- ❖ Missing Values
- ❖ Corrupted data
- ❖ Remove unnecessary data

STEP 4 – EXPLORATORY DATA ANALYSIS – So, here you basically become a detective in the stage. So this stage, which is EDA or Exploratory Data Analysis, is like the brainstorming stage of machine learning. Exploratory Data Analysis involves understanding the patterns and trends in your data. At this stage all the useful insights are drawn and any co – relations between the variables are understood. What do I mean by trends and patterns and correlations?

Example – which is we have to predict the rainfall on a particular day. So we know that there is a strong possibility of rain if the temperature has fallen law. So we know that our output will depend on variables such as temperature, humidity, and so on. Now to what level it depends on these variables, we will have to find out the patterns, and we have to find out the correlations between such variables. So such patterns and trends have to be understood and mapped at this stage. So this is what exploratory data analysis is about. This is where you will understand what exactly your data is and how you can form the solution to your problem.

STEP 5 – BUILDING MACHINE LEARNING MODEL –

At this stage a predictive model is built by using MACHINE LEARNING Algorithm such as linear regression, decision trees, etc.

1. MACHINE LEARNING model is built by using the training data set.
2. The model is the MACHINE LEARNING algorithm that predicts the output by using the data fed to it.

So, all the insights and the patterns that you derive during the data exploration are used to build a machine learning model. So this stage always begins by splitting the data set into two parts, which is training data and testing data. So, when you building a model you always use the training data. So you always make use of the training data in order to build the model.

What is training Data?

Training data is the same input data that you are feeding to the machine. The only difference is that you are splitting the data set into two. You randomly picking 80% of your data and you are assigning for training purpose. And the rest 20%, probably, you will assign it for testing purpose. Another thing that the training data is always much more than your testing data, obviously because you need to train your machine. And the more data you

feed the machine during the training phase, the better it will be during the testing phase. Obviously, it will predict better outcomes if it is being trained on more data.

So the model is basically using the ML algorithm that predicts the output by using the data fed to it. Now in the case of predicting rainfall, the output will be a categorical variable, because we will be predicting whether it is going to rain or not. So let's say we have an output variable called rain. The two possible values that this variable can take is yes it is going to rain and no it won't rain. So that is outcome.

Our outcome is a classification or a categorical variable. So for such cases where your outcome is a categorical variable, you will be using classification algorithms.

Example of a classification algorithm is logistic regression or you can also support vector machines, you can use K nearest neighbor, and you can also use naïve Bayes, and so on.

Now like I said, choosing the ML algorithm depends on the problem statement that you are trying to solve because of N number of ML algorithms. We will have to choose the algorithm that is most suitable for your problem statement.

STEP 6 – **MODEL EVALUATION & OPTIMIZATION** –

Model evaluation and optimization is nothing but you are testing how well your model can predict the outcome. So at this stage, you will be using the testing data set.

Once you have tested your model, you need to calculate the accuracy. You need to calculate how accurately your model is predicting the outcome.

The efficiencies of the model is evaluated and any further improve in the model are implemented.

- Machine Learning model is evaluated by using the data set.
- The accuracy of the model is calculated
- Further improvements in the model are done by using techniques like Parameter tuning and cross validation methods in order to improve the performance of the model.

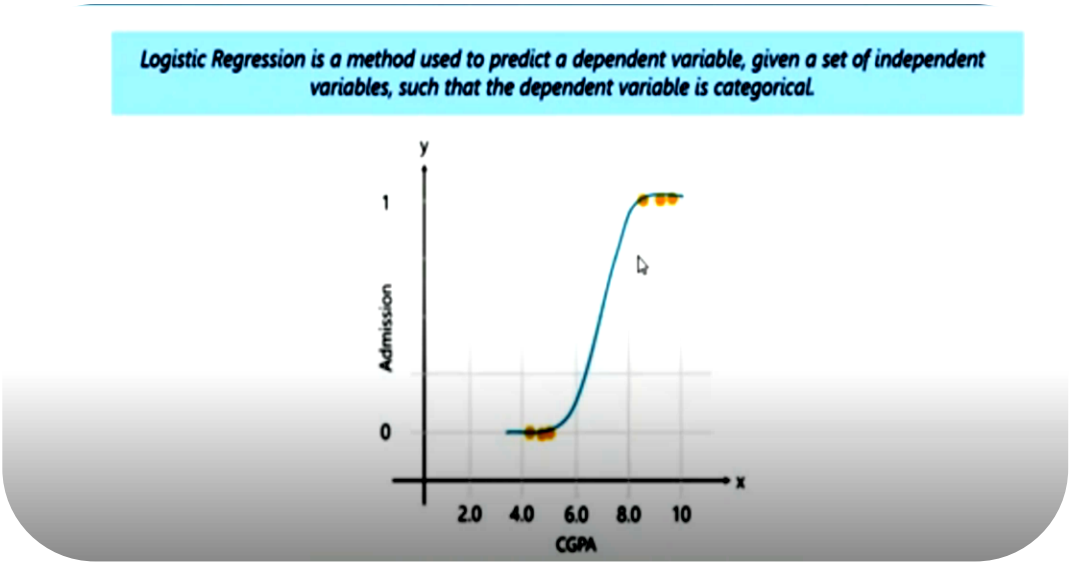
STEP 7 – PREDICTIONS – Once a model is evaluated and once you have improved it, it is finally used to make predictions. The final outcome can either be a categorical variable or a continuous variable. All of this depends on your problem statement.

In our case we are predicting the occurrence of rainfall; the output will be categorical variable. It is obvious because we are predicting whether it is going to rain or not. The result, we understand that this is a classification problem because we have a categorical variable.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

XXV. LOGISTIC REGRESSION

Logistic Regression is basically supervised learning algorithm that is used to predict categorical quantities.

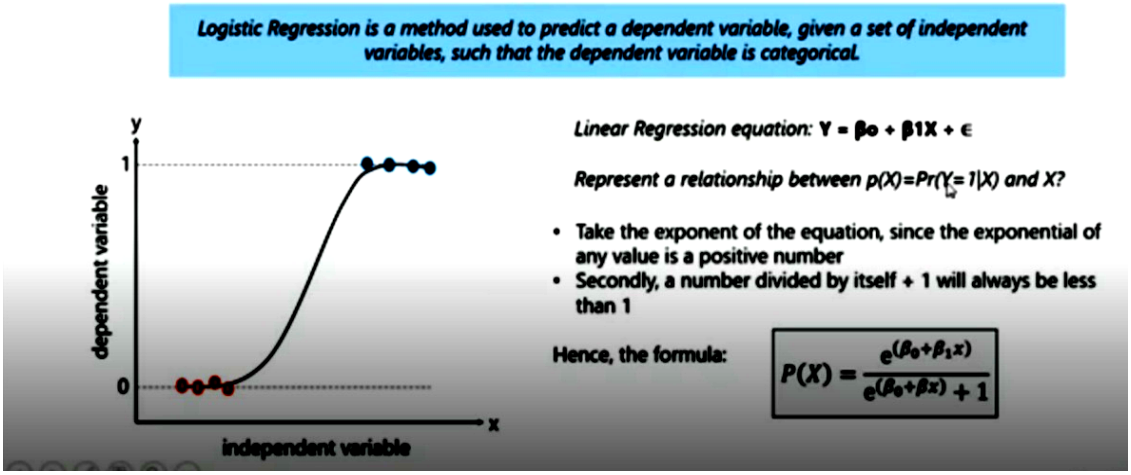


To understand logistic regression, let's consider small scenarios. Let's say your little sister is trying to get into grad school and you want to predict whether she will get admitted in her dream school or not. Based on her CGPA and the past data, you can use logistic data to foresee the outcome. So logistic regression will allow you to analyze the set of variables and predict a categorical outcome. Since here we need to predict whether she will get into a school or not, which is a classification problem, logistic regression will be used. So when the result in outcome can take only classes of values, like two classes of values, it is sensible to have a model that predicts the value as either zero or one, or in a probability form that ranges between zero and one. Logistic Regression is used to predict categorical quantities.

How does it work?

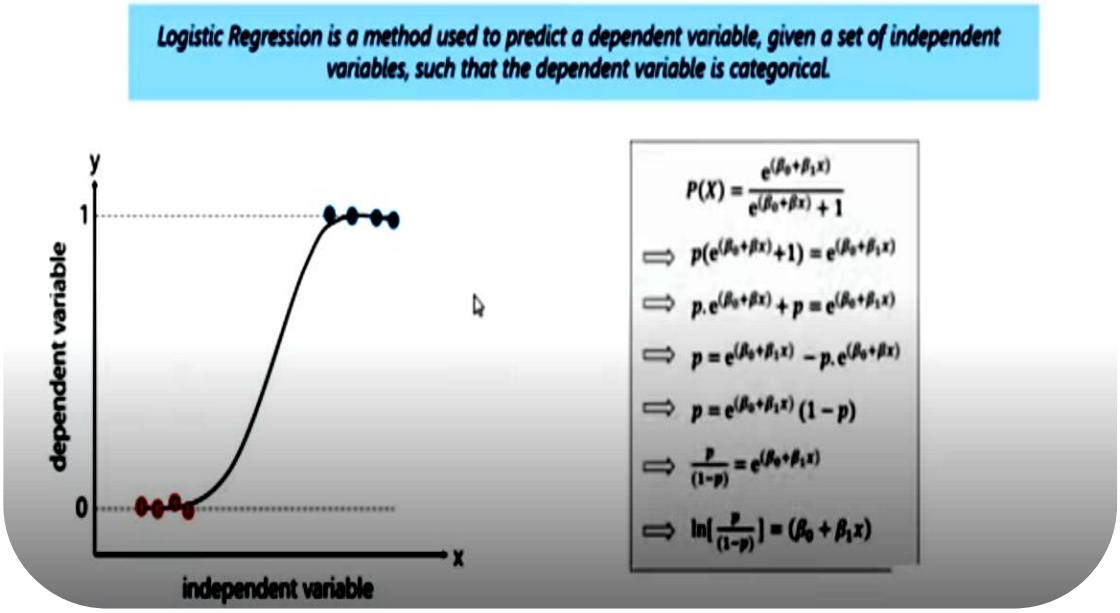
First understand the linear regression equation. This was the logistic regression equation. Outcome in a logistic regression is categorical. Categorical outcome will either be zero or one or it will be a probability that ranges between zero and one. So that's why we have this S curve. We have something known as sigmoid curve because we can have values ranging between zero and one, which will basically show the probability. So, maybe your output will be 0.7, which is a probability value if it is 0.7 it means that your outcome is basically one. So that's we have this sigmoid curve like this.

e-ISSN: 2231-5152; p-ISSN: 2249-1796



Linear Equation already discussed above. Y here stands for the dependent variable that needs to be predicted beta naught is nothing by the y intercept. Beta one is nothing but the slope and X here represents the independent variable that is used to predict y. That E denotes the error on the computation. So, given the fact that x is the independent variable and y is the dependent variable, how can we represent a relationship between x and y so that y ranges only between zero and one? Here this value basically denotes probability of y equal to one, given some value of x. So here, basically Pr, denotes probability and this value basically denotes that the probability of y equal to one, given some value of x, this is what we need to find out. If you wanted to calculate the probability using the linear regression model, then the probability will look something like P of X equal to beta naught plus beta one into X. P of X will be equal to beta naught plus beta one into X, where P of X nothing but your probability of getting y equal to one, given some value of x. so the logistic regression derived from the same equation, except we need to make a few alterations, because the output is only categorical. So, logistic regression does not necessarily calculate the outcome as zero or one. Instead, it calculates the probability of a variable falling in the class zero or class one. So that's how we can conclude that the resulting variable must be positive, and it should lie between zero and one, which means that it must be less than one so to meet these conditions, we have to do two things First, we can take the exponent of the equation, because taking an exponential of any value will make sure that you get a positive number. Secondly we have to make sure that your output is less than one. So, a number divided by itself plus one will always be less than one. So that's how we get this formula. First, we take the exponent of the equation, beta naught plus beta one plus x and then divide it by that number plus one. So this is how we get this formula.

e-ISSN: 2231-5152; p-ISSN: 2249-1796



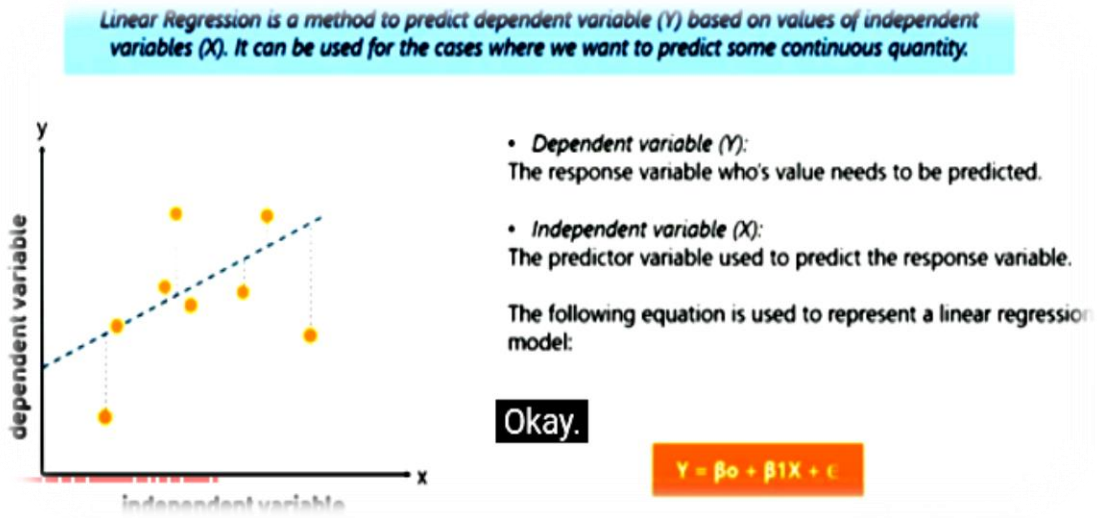
Now the next step is to calculate something known as a logic function. Now the logic function is nothing, but it is a link function that is represented as an S curve or as a Sigmoid curve that ranges between the value zero and one. It basically calculates the probability of the output variable. So if you look at this equation, its quite simple. We just cross multiply and take each of our beta naught plus beta one into x as common. The RHS denotes the linear equation for the independent variables. The LHS represents the odd ratio. So if you compute this entire thing you will get this final value, which is basically your logistic regression equation. Your RHS here denotes the linear equation for independent variables, and your LHS represents the odd ratio which is also known as the logic function. Logic function is basically a function that represents an S curve that bring zero and one this will make sure that our value ranges between zero and one. So in logistic regression, on increasing this X by one measure, it changes the logic by a factor of beta naught. It is the same thing in logistic regression. Logistic regression is used for classification.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

XXVI. IN OTHER CASE – LINEAR REGRESSION

A PSYCHOLOGICAL ANALYSIS OF HUMAN BEHAVIOUR HELPS YOU TO SEARCH CRIMINALS AROUND YOU. THIS RESEARCH IS DESIGNED MATHEMATICALLY, SCIENTIFICALLY, GEOGRAPHICALLY IN INTERESTING WAY

CRIMINAL INVESTIGATION PREDICTION – Linear Regression is basically supervised learning algorithm that is used to predict a continuous dependant variable y based on the values of independent variable x. The important thing is to note here that the dependent variable y, the variable that you are trying to predict, is always going to be a continuous variable. But the independent variable x, which is basically the predictor variables, these are the variables that will be using to predict your output variable which is nothing but your dependant variable. So your independent variables or your predictor variables can either be continuous or discreet. There is not such a restriction over here.



Can be either continuous variable or they can be discreet variables.

CONTINUOUS VARIABLE - It is a variable that has infinite number of possibilities. For Ex - Person weight, it can be 160 pound, 161 pounds, or 160.1134 pounds and so on. So the number of possibilities for weight is limitless, and this is exactly what continuous variable is.

In order to understand LINEAR REGRESSION is

Let's assume that you want to predict the price of stock over a period of time. For such a problem you can make use of Linear Regression by studying the relationship between the dependant variable which is the stock price and independent variable, which is the time. So basically you are going to check how the price of a stock, you are trying to predict stock price over a period of time. You are trying to predict the stock price over a period of time. So basically, you are going to check how the price of stock varies over a period of time. So your stock price is going to be your dependant variable or your output variable, and the time is going to be your predictor

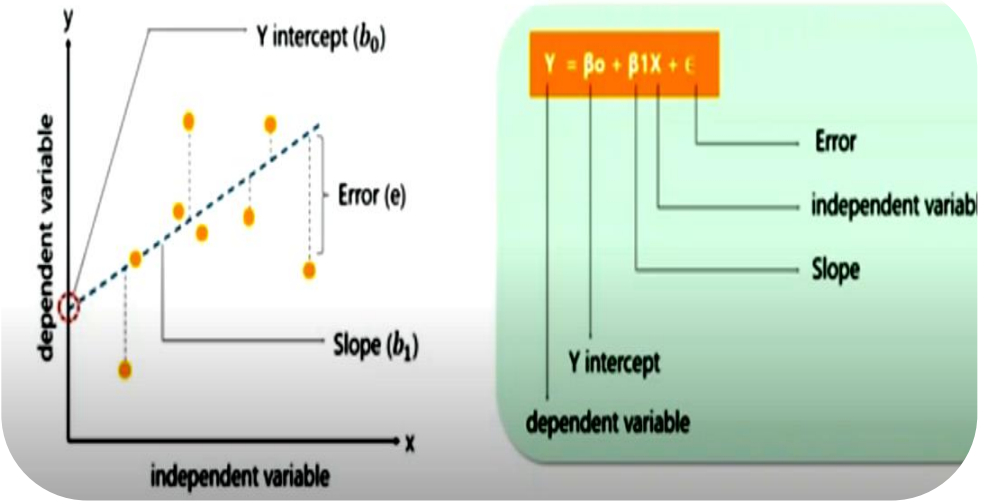
e-ISSN: 2231-5152; p-ISSN: 2249-1796

or your independent variable. Your dependant variable is your output or your predictor variable. So, in our case, the stock price is obviously a continuous quantity, because the stock price can have an infinite number of values.

Now, the first step in Linear Regression is always to draw out your relationship between your dependant and your independent variable by using the best fitting linear length. We make an assumption that your dependant and independent variable is linearly related to each other. We call it Linear Regression because both the variables vary linearly, which means plotting the relationship between these two variables; we'll get more of a straight line, instead of a curve.

Let's discuss the math behind linear regression.

Equation in yellow shade



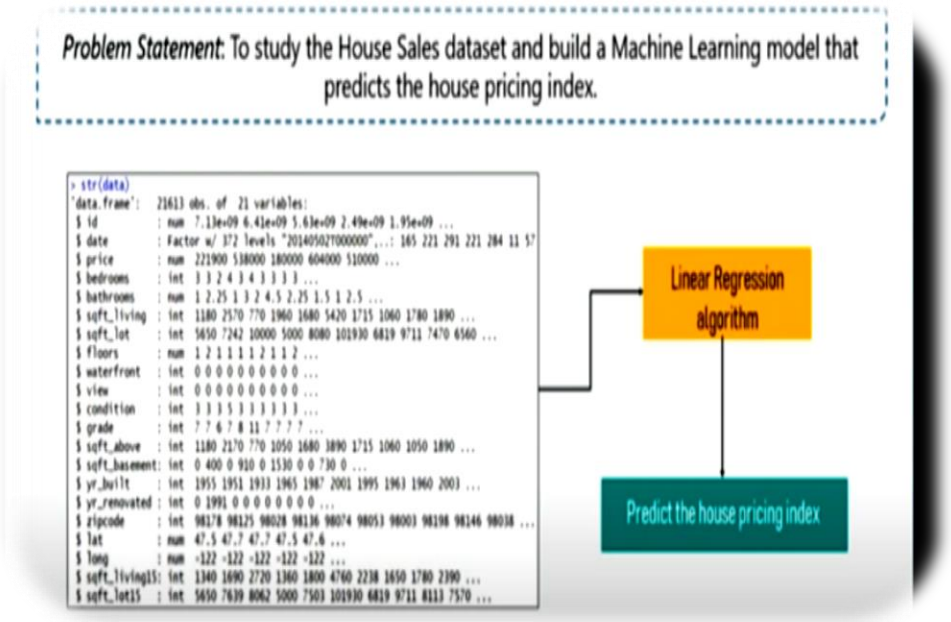
In above picture, Equation denotes the relationship between your independent variable x, which is here, and your dependant variable y. This is the equation we are trying to predict; we all know that the equation for a linear line in math is y equals mx plus c. So the equation for a linear line in math is y equals to mx plus c. Similarly, the linear regression equation is represented along the same line. Y equals to mx plus c. There is just a little bit of changes, but first understand this equation properly. So y basically stands for your dependant variable that you are going to predict B naught is the y intercept. Now y intercept is nothing but this point here.

Now in this graph, basically showing the relationship between your dependant variable y and your independent variable x, this is the linear relationship between these two variables. Now your y intercept is basically the point on the line which touches the y axis. This is y interceptor which is represented by B naught. Now B one or beta is the slope of this line now the slope can either be negative or positive, depending on the relationship between the dependent and independent variable. The next variable that we have is x. x here represents the independent variable that is used to predict our resulting output variable. Basically, x is used to predict the value of y. E here denotes the error in the computation. For Ex - This is actual line, and these dots here represent the predicted values. Now the distance between these two is denoted by the error in the computation.

So this is the entire equation.

Linear Regression will basically draw a relationship between your input and your output variable.

Problem Statement: To study the House Sales dataset and build a MACHINE LEARNING model that predicts the house pricing index.



To solve this

first we need to understand what the target variable is, what are the possible predictor variable that you will need. The first thing we should look at target variable. You should understand if this is a classification, regression or clustering problem look at your target variable or your output variable that you are supposed to predict.

EXAMPLE OF CRIMINAL INVESTIGATION

Like a circle in a spiral,

Ranbeer Raichand had called CID and informed that his wife has murdered.

Police do enter in investigation.

CID officer asked to Police Officer - Any Preliminary findings.

Police Officer replied, "According to our preliminary investigations it looks like a rape and murder. But it is just guess work. But murder, for sure".

e-ISSN: 2231-5152; p-ISSN: 2249-1796

CID Officers predicted, "There are no signs of any breaking and or breaking the lock.
There are no cups of tea, coffee and drinks". "Whoever did this must have entered from the window."

Maybe Naina Raichand was in her room and came down hearing the commutation. And that's how the struggle happened in the living room which is how the vase got knocked off and broke.

Good Theory as if now to investigate the case.

CID Officers predicted, "This looks well planned, nothing was stolen from the house So whoever did this, came here of raping and murdering Naina Raichand. He came here to rape her and also killed her in a fit of rage or he came for murder and raped her as well.
This is either a case of lust or a case of hate.

INQUIRED BY CID OFFICERS

CBI Officer asked Mr. Raichand, "Do you know anyone who has enmity with you or with your wife?"

CBI Officer inquired with famous Model Alia Mukherjee, 'How well do you know Ranbeer Raichand?

Famous Model replied, "I had an affair with Ranbeer Raichand" "This phone has all the e-mails and messages which will make it clear who was following who."

CID officers predicted, "Either Ranbeer Raichand or his girlfriend Alia has committed this murder" CID officers inquired him at headquarter, "So, Mr. Raichand, Do you know Alia? Alia - Mukherjee - The model.

Mr. Raichand replied, "Oh yeah." She had done ad campaign for my company".

CID officer, "Do you share only this much relation with her?"

Mr. Raichand, "What do you mean?"

CID Officer, "I mean did you have affair with Alia or not"?

Mr. Raichand surprisingly asked, "What? What are you talking about?"

Raichand's lawyer asked to officer, "what is the connection with Naina Raichand's murder".

CBI officer replied, "Wife dies and you say that girlfriend has no connection? Do you really think we will believe that?"

Mr,. Raichand, "You people have met Alia".

e-ISSN: 2231-5152; p-ISSN: 2249-1796

CBI Officer replied, "We met her this morning, she is as truthful as beautiful she is". She gave her phone to us. There is a large number of calls and messages of you are recorded in it."
"Confession of your love, its test, and obsession as well"

Raichand told the story of Alia to CID Officers, "Ranbeer asked with Alia, Did you wake up early or did not sleep at all?
Alia replied, "I was sleeping all my life. It is just today I woke up,
Mr. Raichand to Alia, "I hope I did not wake you up?
Alia replied, "No, it's not called waking up, it's called awakening. You have awakened my lifeless life."

CBI officers predicted, "According to me, it is the beginning of romance".

Mr. Raichand replied, "And according to me," That I was going to the victim of obsession"

> **POINT TO BE CONSIDERED HERE,**
> **Digital Evidence - "Any data that is recorded or preserved on any medium in or by a computer system or other similar device, that can be read or understand by a person or a computer system or other similar device. It includes a display, print out or other output of that data.**

If you watching video on YouTube also accounts for data generation so, there is data everywhere. So with the availability of so much data, it is finally possible to build predictive models that can study and analyze complex data to find useful insights and deliver more accurate results. So, top tier companies like Netflix and Amazon build such machine learning models by using tons of data in order to identify any profitable opportunity and avoid any unwanted risk.

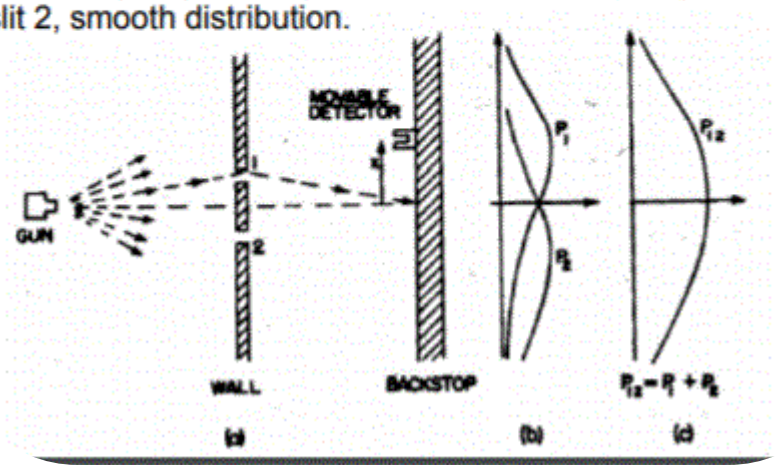
The most important thing for ARTIFICIAL INTELLIGENCE is data.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

BULLETS

2-slit experiments with bullets (classical particles)

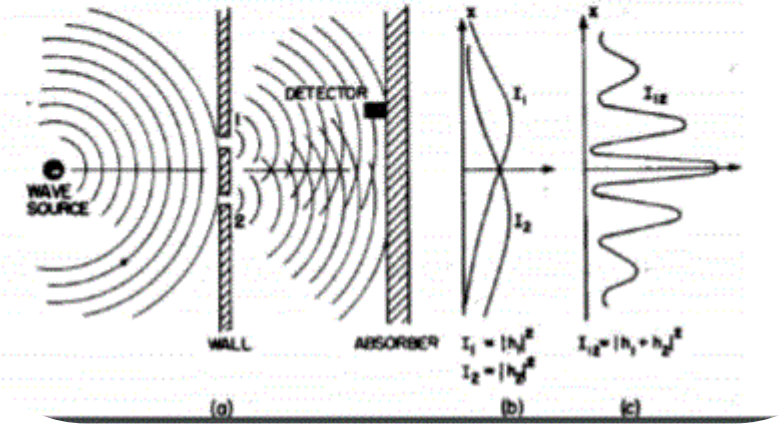
- Bullets always come in "lumps" -- identical size, mass particles.
- No interference: probability to arrive at screen is sum of probability to go through slit 1 and probability to go through slit 2, smooth distribution.



WATER

2-slit experiments with water (classical waves)

- Intensity of water waves propotional to height^2
- Intensity of waves reaching detector through slit 2 when slit 1 is closed is smooth, and vice versa.
- When two waves are allowed to pass through 1 and 2 at same time, interference pattern is created.

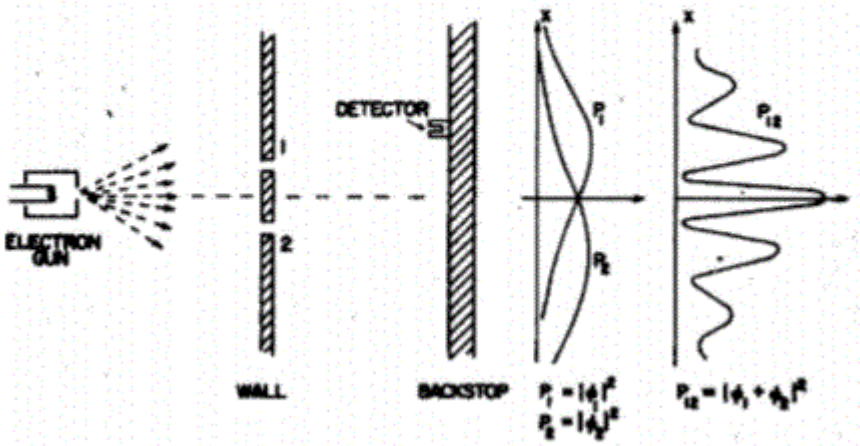


e-ISSN: 2231-5152; p-ISSN: 2249-1796

ELECTRONS

2-slit experiments with electrons (do they behave like bullets or waves?)

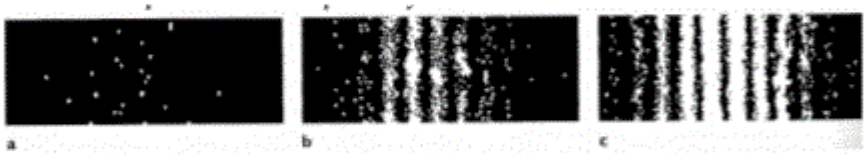
- Interference pattern observed by detector at screen



$\phi=\psi$=Schroedinger's wave function!

So--electrons are waves?

- Wait--we can slow gun down so that only 1 electron per hour goes through. Then we expect electron goes through slit 1 or 2, right? Every hour we get a new spot on the screen.
- Interference pattern builds up slowly:



So: electrons are "particle-waves"!

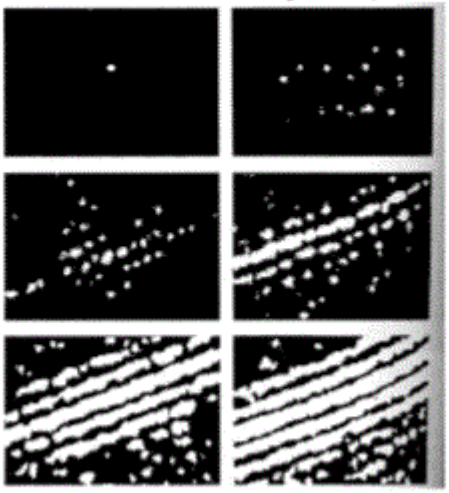
They exhibit properties of classical waves *and* particles

e-ISSN: 2231-5152; p-ISSN: 2249-1796

LIGHT

2-slit experiments with light

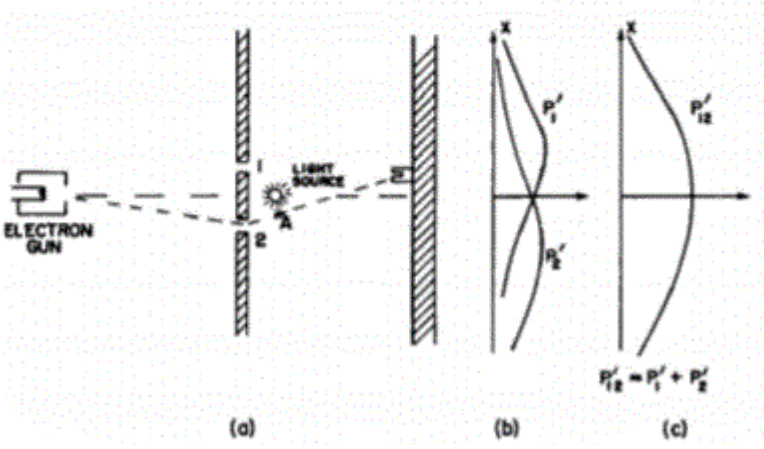
Weaken laser beam so that very few photons come out!



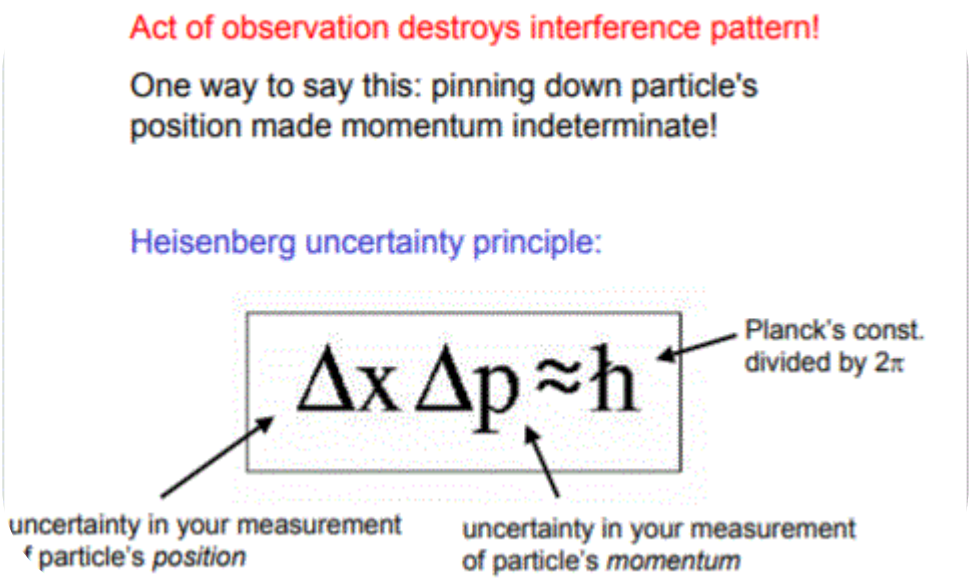
Light is "particle-wave" just like electrons!
(except photons move at speed of light, have no mass)

Observing which slit electrons go through I)

Wait a minute: if electrons can be seen to go through one slit or the other, how can they interfere with themselves? Let's try to determine which slit they pass through with a "camera"



e-ISSN: 2231-5152; p-ISSN: 2249-1796



Observing which slit electrons go through II)

Maybe the light we used to observe the electron bumped it somehow, destroying interface. How about if we reduce the light's intensity or frequency?

Reduce intensity: sometimes electron isn't observed -- then it contributes to interference!

Reduce frequency: We said we can not you can not resolve anything smaller than the wavelength of light? When wavelength gets bigger than distance between slits, interference pattern comes back! Heisenberg again.

At small scales physics does not agree with our intuition. Rules of quantum mechanics predict results of all experiments so far, even if we have no "deeper" understanding.

Particle is described by a "probability amplitude" to be somewhere".

XXVII. NASH EQUILIBRIUM

Nash equilibrium is one of the fundamental concepts in game theory. It conceptualizes the behavior and interactions between game participants to determine the best outcomes. It also allows predicting the decisions of the players if they are making decisions at the same time and the decision of one player takes into account the decisions of other players.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

XXVIII. GAME THEORY DEFINITION

Game theory is a theoretical framework for conceiving social situations among competing players. In some respects, game theory is the science of strategy, or at least the optimal decision making of independent and competing actors in a strategic setting.

XXIX. DIGITAL INTELLIGENCE

If the meaning of the words "machine" and "think" are to be found by examining how they are commonly used. It is easy to escape the conclusion that the meaning and the answer to the question, "Can machines think?" is to be sought in Criminal Cases such as criminal investigations. Criminal Investigations are closely related to it and is expressed in relatively unambiguous words. Forensic investigation is the gathering and analysis of all crime – related physical evidence in order to come to a conclusion about a suspect. Investigations will look at blood, fluid, or fingerprints, residue, hard drives, computers or other technology to establish how to crime took place. Forensic psychology, forensic chemistry, forensic engineering, bloodstain pattern analysis all are the part of it.

Digital Intelligence is mastering the science of digital forensics.

Goal: To solve complex millennium problem easily.

Technology behind the Remote Connections, video calling, WhatsApp Messenger, Router, Domain, The MSN Messenger code displays a “thumbs up” emotion in the form of graphical representation, either in the form of an image or made cep of text characters of a particular face expression, all are good examples.

Let’s take one example of Screen Sharing – HOW TO CONNECT WITH PC

Steps will be

① Allow remote connections
② Enable server to accept remote connection
③ Connect remotely desktop by chit chat app
④ Share screen with the sub- ordinate employees to ask and solve the queries instead of going on desk.
⑤ It can save time cost effectively

e-ISSN: 2231-5152; p-ISSN: 2249-1796

XXX. WHAT IS COMPUTER FORENSICS?

"Forensic computing is the process of identifying, preserving, analyzing and presenting digital Evidence in a manner that is legally acceptable." Evidence might be required for a wide range of computer crimes and misuses.

Information collected assists in arrests, prosecution, termination of employment, and preventing future, illegal activity.

Digital Evidence - "Any data that is recorded or preserved on any medium in or by a computer system or other similar device, that can be read or understand by a person or a computer system or other similar device. It includes a display, print out or other output of that data.

FORENSIC SCIENCE

If the meaning of the words "machine" and "think" are to be found by examining how they are commonly used. It is easy to escape the conclusion that the meaning and the answer to the question, "Can machines think?" is to be sought in Criminal Cases such as criminal investigations. Criminal Investigations are closely related to it and is expressed in relatively unambiguous words. Forensic investigation is the gathering and analysis of all crime – related physical evidence in order to come to a conclusion about a suspect. Investigations will look at blood, fluid, or fingerprints, residue, hard drives, computers or other technology to establish how to crime took place. Forensic psychology, forensic chemistry, forensic engineering, bloodstain pattern analysis all are the part of it.

Objectives of crime scene investigation –

In forensic science we consider five reasons of crime scene investigation:

I. Development of direction of inquiry.
II. And investigate variants for investigators; search of specific information in the form of evidence or logic investigation; search of convincing evidence justifying or evidence of guilt;
III. Search for important information in the form of evidence in order to successfully carry out accurate reconstruction of the crime scene,
IV. And find the connection between criminals with the help of the evidence.

This set of objectives allows getting more knowledge about the mechanism of a crime in order to obtain detailed information from the investigation.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

XXXI. TOP LOCATIONS FOR EVIDENCE

i. **Internet history files**
ii. **Temporary Internet Files**
iii. **Slack/Unallocated Space**
iv. **Buddy lists, personal chat room records, others saved areas**
v. **Settings, folder, structure. File names**
vi. **File Storage Dates**
vii. **Software/Hardware added**
viii. **File Sharing ability**
ix. **E - Mails**

FOR EXAMPLE:

AGENT RAGHAV is the First thrilling investigative series on Indian Television; consists of PSYCHOLOGICAL IDENTIFICATION hard – core procedural stories dealing with investigation, detection, and suspense and analysis.

(Psychological Identification)

" A PSYCHOLOGICAL ANALYSIS OF HUMAN BEHAVIOUR HELPS YOU TO SEARCH CRIMINALS AROUND YOU".

FOR EXAMPLE

1. Check Mental State (Example - if he/she Booked Movie ticket)
2. PSYCHOLOGICAL READING
   - No newspaper found in home,
   - Last Year Calender
   - Dust at TV
   - Mobile broken
   - Photo torn (Mark of fight)

It means not active with outer world.

THE NIGHT IS YOUNG; scenario related with criminal investigation with Psychological Identification.

(Psychological Identification)

- **"** A PSYCHOLOGICAL ANALYSIS OF HUMAN BEHAVIOUR HELPS YOU TO SEARCH CRIMINALS AROUND YOU**"**.
- Trained psychiatrist can Hypnotize in 8 minutes.
- Hypnosis

e-ISSN: 2231-5152; p-ISSN: 2249-1796

FOR EXAMPLE

3. Check Mental State (Example - if he/she Booked Movie ticket)
4. PSYCHOLOGICAL READING
   - No newspaper found in home,
   - Last Year Calender
   - Dust at TV
   - Mobile broken
   - Photo torn (Mark of fight)

It means not active with outer world.

The verse is written with a poetic structure of seven lines are scenario where we can easily understand

SCENARIO – 1

THE NIGHT IS YOUNG

The night is young, full of sexy promises,
A hazy wind is blowing.
You always fail at love. I burn in love
Our names are notorious.
I could use you, don't think too much.
I'll leave the world behind for you. Why worry?
The beauty conquers your heart.

Suppose Katrina Kaif was dancing on above item number in Dance Bar, the scenario here that some people are suddenly began to vanish inside this bar.

Case come to CBI, Chief Handover this case to CBI Team Leader, Trisha and then CBI investigates the matter with her subordinates and follow below steps according to plan –

i. First thing they observed the map to understand the locations. So every person must know the world map to investigate the matter.
ii. Second very own thing is phone records. Incoming, Outgoing, and messages.
iii. Third thing identify the distance between origin and the place where crime happened.
iv. Phone Records
v. Highway

e-ISSN: 2231-5152; p-ISSN: 2249-1796

vi. Map
vii. Identify the Distance
viii. Divide place in small
ix. Search in hotels and restaurant

XXXII. UNDERSTANDING THE WORLD MAP BY DESIGN THINKING

TRIP TO MYSTERIOUS LOCATION

WORLD MAP BASICS

7 CONTINENTS

AREA WISE

1. **Asia**
2. **Africa**
3. **North America**
4. **South America**
5. **Antarctica**
6. **Europe**
7. **Australia**

POPULATION WISE

1. **Asia**
2. **Africa**
3. **Europe**
4. **North America**
5. **South America**
6. **Australia**
7. **Antarctica**

OCEANS

1. **Pacific Ocean (Prashant) (big)**
2. **Atlantic Ocean**
3. **Indian Ocean (Hind)**
4. **Arctic Ocean**
5. **Southern Ocean (Antarctic Ocean)**

- **Volume**
- **Depth**
- **Coastal Line**

e-ISSN: 2231-5152; p-ISSN: 2249-1796

- **Latitude (Parallel lines upper side)**
- **Longitude**
- **Equator divide earth in two parts**
- **Hemisphere (Upperside Northern, Lower Southern hemi)**
- **U 23degree and half tropic of cancer**
- **L 23degree and half tropic of capricon**
- **U66 degree and half north Arctic circle**
- **L66degree and half Antarctic circle**

0-degree vertical Imaginary Line (Prime Meriddean)

1. **North Pole**
2. **South Pole**

1. **Equator (bhumadhya rekha) 0-degree reference (base)**

IMPORTANT THING TO UNDERSTAND

- **IMAGINARY LINE (GPS are working on the basis of Equator line). We trace location on this imaginary line. GPS (Global Problem Solver)** (Newell & Simon 1961) does not only need to solve the problems but should human thought process. **Google Map is an example.**
  - **Latitude and Longitude intersect at near Africa in (Gulf of ginni)**

EURASIA

- **Eural Mountains (Separate Asia and Europe)**
- **Europe +Asia (Eurasia)**

OCEANIA

- **Australia and nearby areas are Oceania.**

ANOTHER SCENARIO:

Dr. Salunke gets a huge shock as he observes a bluebottle
Let's take example of CID episode where Doctor Tarika in danger.

CID is the First thrilling investigative series on Indian Television; C.I.D. consists of hard - core procedural stories dealing with investigation, detection, and suspense and analysis.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

2. SCENARIO

Dr. Salunke gets a huge shock as he observes a bluebottle fly in his break- fast which is mostly found on dead bodies thus he urgently calls his servant Balwant to verify the same later, he checks his kitchen and finds a jar filled with bluebottle files, there in the forensic lab, Dr. Salunke gets another huge shock as he fails to find Tarika in the lab so he informs ACP Pradyuman about it later , an unknown person leaves box outside CID office and thus they were shocked to view C.D. which showed that Tarika is hanging on a ice cube which is melting . Will C.I.D. team succeed in finding and saving Dr. Tarika before the ice melts down?

THEY WILL FOLLOW BELOW STEPS TO COLLECT THE EVIDENCE TO INVESTIGATE THE MATTER -

- GPS FOR LOCATION TRACING BY GOOGLE MAP
- MOBILE TRACING
- CCTV CAMERA FOOTAGE
- CHECK FINGER PRINTS IN DATABASE
- HEIGHT AND WEIGHT IDENTIFICATION
- CHEMICAL ANALYSIS OF BLUE FLIES
- CHECK PHONE RECORDS, INCOMING, OUTGOING, WHATSAPP MESSAGES, VIDEO CALLS, MMS, ETC.
- CHECK CCTV SURVEILLIENCE
- TRAFFIC
- RAIN
- DATABASE
- HACKING
- DNA TEST
- TRAFFIC SIGNAL
- LOGO FINDER
- BIOMETRIC
- SPECIAL IDENTITY CARD
- BOMB DETECTOR

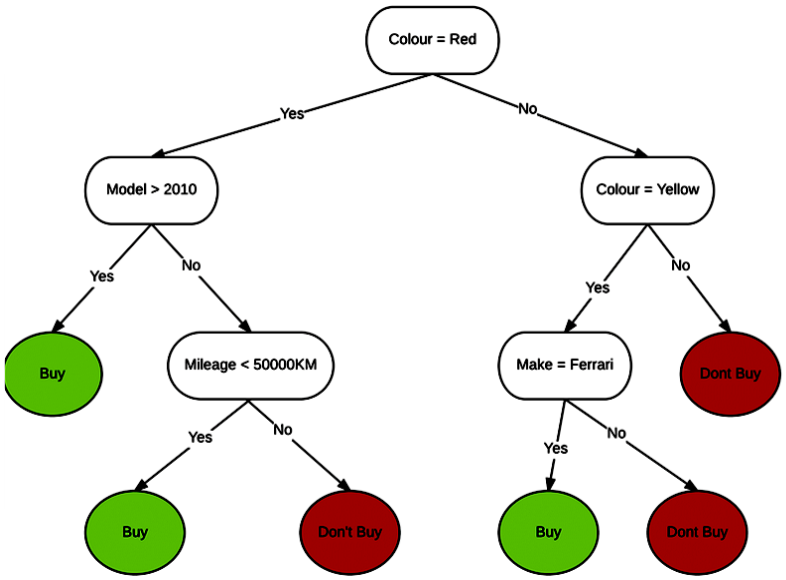
Let’s take example of DNA STRUCTURE - To demonstrate the scale of the potential impact, the OECD (2018[64]) gives the example of the discovery of DNA structure in the 1950s leading to a revolution in industrial biotechnology and the creation of vast economic value (the global market for recombinant DNA technology has been estimated at around USD 500 billion).

e-ISSN: 2231-5152; p-ISSN: 2249-1796

XXXIII. EXAMPLE OF DECISION TREE

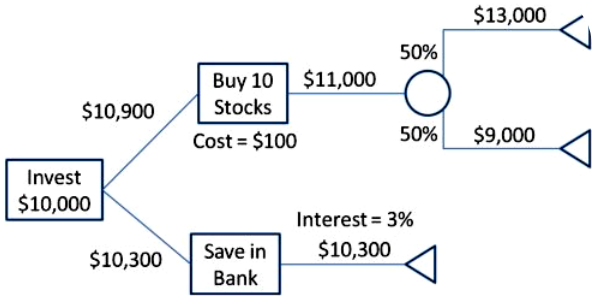
➢ BUYING A CAR

As you can see, most of the decision tree examples are related to real-life problems and their visual representation. In this, we will consider a person's preference for buying a car. If the color is red, then further constrains like built year and mileage is considered. If not, then the brand of the vehicle is kept in mind. Wherever these conditions are not met, the car is not bought. On the other hand, it would be bought if it is red and newer than 2010, red car with good mileage, or a yellow Ferrari.



➢ MONEY INVESTMENT DECISION

This is another one of those decision tree examples that we face in real-world on a frequent basis. In this, we will consider different options for investing money. If we just keep it in the savings account, then we will get a certain return. Another option involves investing money in stocks while further dividing it into two sources by half. Since the return from the stocks is more, it seems like a better investment option.



e-ISSN: 2231-5152; p-ISSN: 2249-1796

XXXIV. RANDOM FOREST

In the era of stringent and dynamic business environment, it is crucial for organizations to foresee their clients' delinquency behavior. Such environment and behavior create unreliable base for strategic planning and risk management. Business Analytics combines the business expertise and computer intelligence to assist the decision makers by predicting an individual's credit status.

RANDOM FOREST TREES

Random Forest could give better results with "Boosting" and "Bagging"

Opening the door for an investigation area of the injected randomness effects on prediction accuracy. The pseudo code of a modified version of Random Decision Forests (RDF) used in Heursticlab environment.

(HeuristicLab is a framework for heuristic and evolutionary algorithms that is developed by members of the Heuristic and Evolutionary Algorithms Laboratory (HEAL))

Algorithm: **Modified RDF Algorithm**

Input: training set of size N, having M independent variables

Input Parameters: r, m, n

T1 = generate n by nT random and unique samples of training set

G1 = rest of training set

for each node

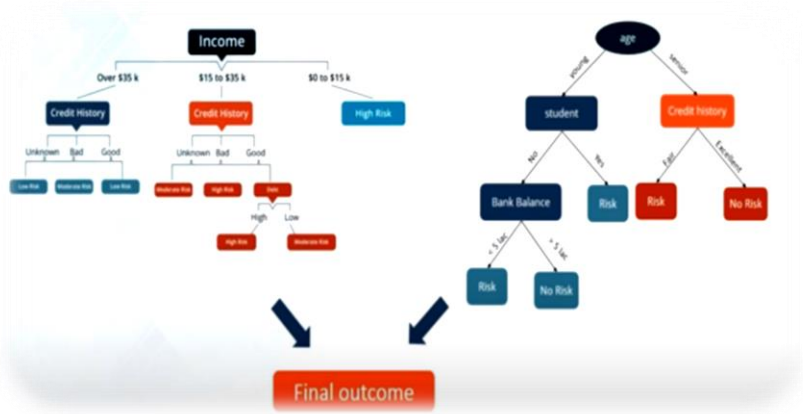
randomly choose m variables

calculate best split in T1 according to m

repeat nT times

EXAMPLE OF RANDOM FOREST - CREDIT RISK DETECTION

e-ISSN: 2231-5152; p-ISSN: 2249-1796

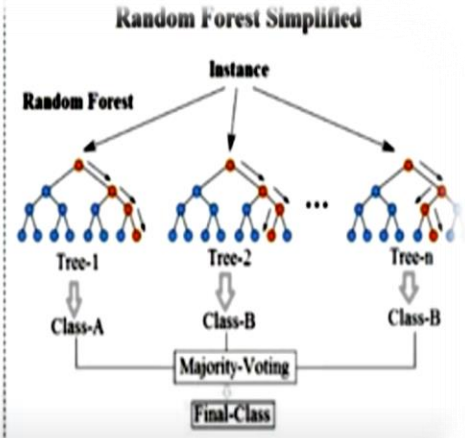


To minimize loss, the bank needs a decision rule to predict whom to give approval of the loan.

- An applicant's demographic (income, debts, credit history) and socio-economic profiles are considered.
- Data science can help banks recognize behavior patterns and provide a complete view of individual customers.

Variable	Measurement
Marital Status	Married, Not Married
Gender	Male, Female
Age	Varied
Status	Default, Non Default
Time of Payment	Varied
Employment	Employed, Unemployed
Homeownership	With Home, Without Home
Education Level	Secondary and above, Below secondary

- Random Forest - a versatile algorithm capable of performing both
  i) Regression
  ii) Classification
- It is a type of ensemble learning method
- Commonly used predictive modelling and machine learning technique



EXAMPLE - RANDOM FOREST

Let's say you want to decide if to watch "IMPOSSIBLE MURDER" or not.

So you will decide based on following two actions.

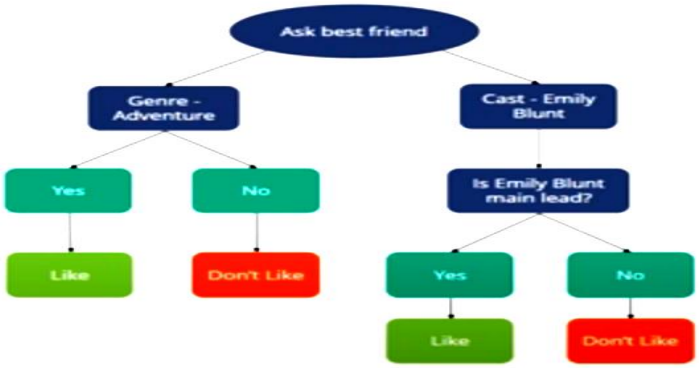
e-ISSN: 2231-5152; p-ISSN: 2249-1796

a. **You can ask your best friend**
b. **You can ask bunch of friends**

To figure out if you will like "IMPOSSIBLE MURDER" or not, your friend will analyze a few things as:

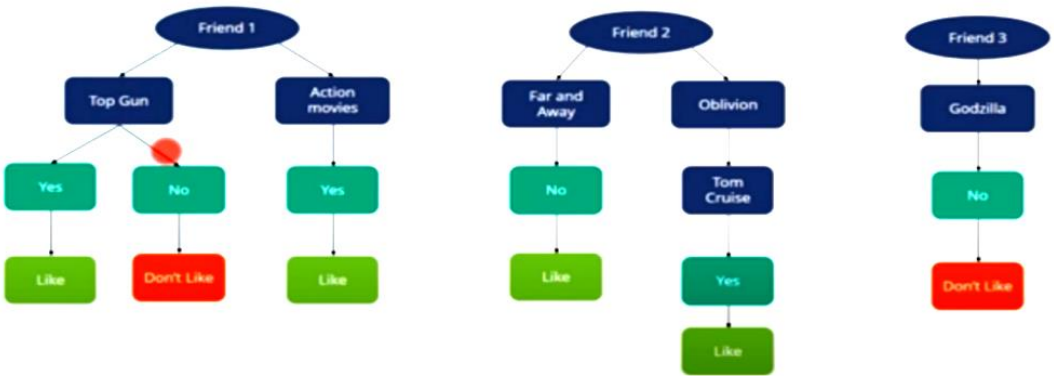
a. **If you like adventure and action**
b. **If you like Emily blunt**

Thus, a decision tree is created by your best friend



In order to get more accurate recommendations, you will have to ask bunch of friends, say

- **Friend 1**
- **Friend 2**
- **Friend 3**



- **Each one of them may take movies of different genre and further decide.**
- **The majority of the votes will decide the final outcome**
- **Thus you build random forest of group of friends.**

XXXV. THE P V NP PROBLEM

A major unsolved problem in computer science; it asks whether every problem in computer science whose solution can be quickly verified can also be solved quickly.

XXXVI. VBA IS BEST EXAMPLE TO PROOF

Every problem in computer science whose solution can be quickly verified can also be solved quickly. **A macro in computer science is a rule or pattern that specifies how a certain input sequence should be mapped to a replacement output sequence according to a defined procedure. The mapping process that instantiates a macro use into a specific sequence is known as macro expansion. Put NP to add the numerator, and then count of NP. Take a test on AI, Smart Phones, etc.**

XXXVII. VBA

Excel's Visual Basic for application (VBA) editor is a very powerful tool. It lets you write and edit custom scripts that automate actions in Excel. In fact, when you record a macro it is stored in VBA code in the VBA editor. The P v NP problem is a major unsolved problem can solved in computer science by VBA automate actions in Excel, whose solution can be quickly verified can also be solved quickly.

A macro in computer science is a rule or pattern that specifies how a certain input sequence should be mapped to a replacement output sequence according to a defined procedure. The mapping process that instantiates a macro use into a specific sequence is known as macro expansion.

- ✓ A Macro a piece of code.
- ✓ Macros are written in programming language i.e. VBA
- ✓ VBA is Visual Basic for applications (Excel, Word, PowerPoint)
- ✓ VBA is editor in Excel, Word.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

For Example, assume you wanted to place your name and your company's information in the upper left cell of a worksheet. You could record a macro in Excel to save your keystrokes as you create it once and then run the macro in the future to repeat the exact same keystrokes you entered. This lets you instantaneously repeat the same process again. While you can see advanced options for creating macros on the "Developer" tab in the Ribbon if it is enabled, you can also use the "Macros" button group on the "View" tab in Ribbon to record a macro in Excel and playback basic macros.

✓ In mathematics and computer science, an algorithm is a sequence of instructions, typically to solve a class of problems or perform a computation. Algorithm is unambiguous specification for performing calculation, data processing, automated reasoning, and other tasks.

✓ Basic Excel formulas and functions Auto Sum, Trim, Proper, delaminate all are helpful to understand this.

✓ A Universally Unique Identifier is a 128-bit number used to identify information in computer systems. The term globally unique identifier (GUID) is also used, typically in software created by Microsoft. A UUID is generated by an algorithm with values that are based on a machine's network address. UUIDs are also part of the Tmodel data structure, which is a service type in the Universal Description Discovery and Integration (UDDI) registry used for Web service discovery.

✓ UUIDs also known as GUIDs. A UUID is 128 bits long, and can guarantee uniqueness across space and time. UUIDs were originally used in the Apollo Network Computing System and later in the Open Software Foundations (OSF) distributed computing environment, and then in Microsoft Windows Platforms.

XXXVIII. AUTOMATION

Interaction with the host application uses OLE Automation - OLE Automation - In Microsoft Windows applications programming. OLE Automation (Later renamed to simply Automation is an inter - process communication mechanics created by Microsoft. It is based on a subset of component object model (COM) that was intended for use by scripting languages. Component object model is a binary interface standard for software component introduced by Microsoft in 1993.

A. EMAIL AUTOMATION - What is email automation? Automated email, also referred to as triggered email or behavior-driven email, is any message automatically sent from your email service provider (ESP) in direct response to an individual user's specific actions made (or not made) on your website or web app.

B. **IMAP & POP3 Server** -

C. IMAP - Internet Messaging Access Protocol. You can use multiple computers and devices to check your mail. Your mails are stored on the server. Sent mail stays on the server so you can see it from any device. POP3 - Post Office Protocol - You can use only one computer to check your email (no other devices). Your mails are stored on the computer that you use. Sent mail is stored locally on your PC, not on a mail server

D. ROBOTIC PROCESS AUTOMATION - Robotic Process Automation is the technology that allows anyone today to configure computer software, or a "robot" to emulate and

integrate the actions of a human interacting within digital systems to execute a business process. RPA robots utilize the user interface to capture data and manipulate applications just like humans do. They interpret, trigger responses and communicate with other systems in order to perform on a vast variety of repetitive tasks. Only substantially better: an RPA software robot never sleeps, makes zero mistakes and costs a lot less than an employee.

E. Email Automation (IMAP & POP3 Server) -

Automation Anywhere11.X ROBOTICS ARTIFICIAL INTELLIGENCE is the best example.

F. Robotic - Mimic of human action, Process - Sequence of meaningful activity, Automation - Task happen without human action

G. RPA can be applied for the automation of transactional rule-based task where structure data and clear predefined rules and parameters are defined. RPA can be used to create invoice. It's advantage - Cost and time saving.

H. Crypto Currency,

I. Block chain

.

If you really look today at the laws we have to protect the environment

XXXIX. DATA PRIVACY AND CYBER SECURITY

ISO 27001 – The 27001 standard does not mandate specific information security controls, generally accepted good practice security controls. Just a tip - GDPR concerns the protection and free movement of personal data defined in article 4 as many "Any information relating to an identified or identifiable natural person is one who can be identified directly or indirectly in particular by reference to an identifier such as name, an identification number, location data, an online identifier or one or more factors specific to the physical, physiological, genetic, mental economic, cultural or social identity of that natural person.

1. **Malware Creator Sentenced** - The developer of a malicious piece of software called NanoCore Rat - which allowed hackers to steal sensitive information and even access the webcam of infected computers will be spending time behind bars

XL. ARTIFICIAL INTELLIGENCE

ARTIFICIAL INTELLIGENCE with lot of do with search algorithm, artificial neural networks, and genetic programming and Java provides many benefits. It is easy to use. Debugging is very easy, package services. There are simplified work will large scale projects. There is a good user interaction, and graphical representation of data. It has something known as the standard widget toolkit, which can be used for making graphs and interfaces so, graphic virtualization is actually a very important part of AI or data science, or MACHINE LEARNING for matter.

For Example: **INTEGRATED AUTOMATION PLATFORM**

e-ISSN: 2231-5152; p-ISSN: 2249-1796

XLI. JAVA (OOPS)

Java considered as a good choice of AI development.

PYTHON PROVIDES VARIOUS OPTIONS FOR DEVELOPING GRAPHICAL USER INTERFACES (GUIS). MOST IMPORTANT ARE TKINTER − TKINTER IS THE PYTHON INTERFACE TO THE TK GUI TOOLKIT SHIPPED WITH PYTHON. THERE ARE SO MANY TKINTER APPLICATIONS.

FOR EXAMPLE - Including **video games like tic - tac –toe, chess, granny, calculator app, an alarm clock app, a to-do list, student or customer management system, etc and Integrated Automation Platforms.**

XLII. INTEGRATED AUTOMATION PLATFORMS

INTEGREON MANAGED SOLUTIONS, a LPO is WORKING on paralegal SOLUTIONS where they are doing document review using PLATFORM RELATIVITY - Button, Check button, Entry, Label, Frame, Scroll, etc. in **"**Relativity**"** Platform.
What are the principles of Data Breach? What kind of this no. is document type? Are kind of work there. Behind the scene I was following the compliance of **"**The Health Insurance Portability and Accountability Act (HIPPA)**"**
HIPPA is a federal law that provides privacy and security standards of medical information.

I EXPLAIN BY INTEGRATED RELATIVITY PLATFORM ABOUT GRAPHICAL USER INTERFACES (GUIS). TKINTER. TKINTER IS THE PYTHON INTERFACE TO THE TK GUI TOOLKIT SHIPPED WITH PYTHON.

AS I HAVE LEGAL EXPERIENCE IN SOME OF FAMOUS LPO'S WITH RELATIVITY PLATFORM

1. INTEGREON MANAGED SERVICES worked on various projects such as "MALVA", I was part of FIRST LINE REVIEW and part of various training on the case brief.

Integreon Managed Solutions, a LPO are WORKING on paralegal SOLUTIONS where they are doing document review on concept of data breach using PLATFORM RELATIVITY - Button, Check button, Entry, Label, Frame, etc. in **"**Relativity**"** Platform.

2. Thomson Reuters India, New Delhi (15th September 2014 -16th July 2016))

I worked on various projects such as HSBC TRIDENT, ALABAMA, and HARLANDCLARKE. I was part of **FIRST LINE REVIEW** and in various projects. I networked with senior associates and management associates.

3. HCL TECHNOLOGY (From 3rd February 2011 - 31st September 2012)

Worked legal projects for summarization and docketing the case as a Legal Analyst. I was part of **FIRST LINE REVIEW** with good understanding of the case.

Part of various training such as LCPS (Legal Content and Publishing Service) & CLS (Corporate Legal Service)

CASES BASICALLY RELATED WITH FBI, LAW FIRMS

RELATIVITY PLATFORM provides eDiscovery software solutions that give corporations, governments, & law firms tools to manage litigation, investigations & FOIA requests. I Learn about Relativity's eDiscovery solutions in to aid legal review, litigation support, document management & much more.

HERE I AM GENERATING IDEA WITH SOME SCREENSHOTS OF RELATIVITY PLATFORM. WE USE THIS PLATFORM FOR CODING PURPOSE WHETHER DOCUMENT IS RESPONSIVE OR NOT RESPONSIVE FOR THE CASE, WHETHER PRIVILEGED OR NOT PRIVILEGED FOR THE CASE.

XLIII. BASIC UNDERSTANDING OF FIRST LEVEL DOCUMENT REVIEW

The primary purpose of first level document review is to review documents and determine whether or not they have "responsive" or "non responsive" as they pertain to a specific legal case or issue. In essence, first level document review forms part of the discovery phase of litigation. It is performed prior to producing and after receiving documents pursuant to a legal "Request for production of documents". It is the initial review phase that helps narrow the document set to responsive and workable data for later, more senior review. The process and procedures of first level document review following by LPO in India. Typically, in litigation, vast amounts – often numbering in the millions – of documents are routinely being reviewed by teams of law firm associates, contract attorneys and paralegal, in an effort to identify whether or not documents are:

a. Relevant to the case at hand
b. Confidential
c. Privileged/protected, and
d. Key or hot
e. Confidential

First Level Document Review is based on GUI Applications. GUI stands for Graphical User Interface. A GUI Application consists of many GUI components such as windows, dialogs, menus, text boxes, input fields, and other controls etc. While using a GUI application, when you perform an action, an event is generated. In event – driven programming, that most GUIs follow, the program responds to the events. Some examples of events are: clicking of mouse, pressing enter key, dragging using mouse and so forth.

To create a GUI application with tkinter you should do the following:

- **Import the module tkinter with command: import tkinter**

e-ISSN: 2231-5152; p-ISSN: 2249-1796

- **Create a blank window by using method tkinter.Tk( ) :**

Wind1=tkinter.Tk( )

Above method will create a GUI based blank window with close, maximize and minimize buttons.

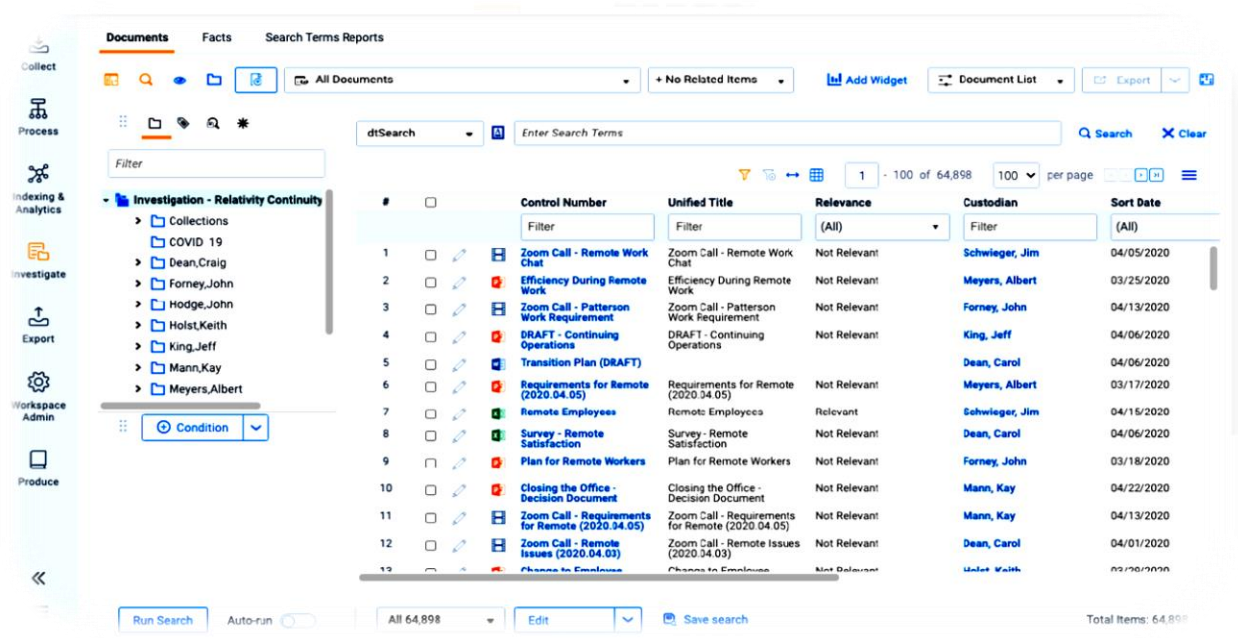
- **Rename the title of the window using method title ( ) as :**

Wind1.title("New tittle of the window")

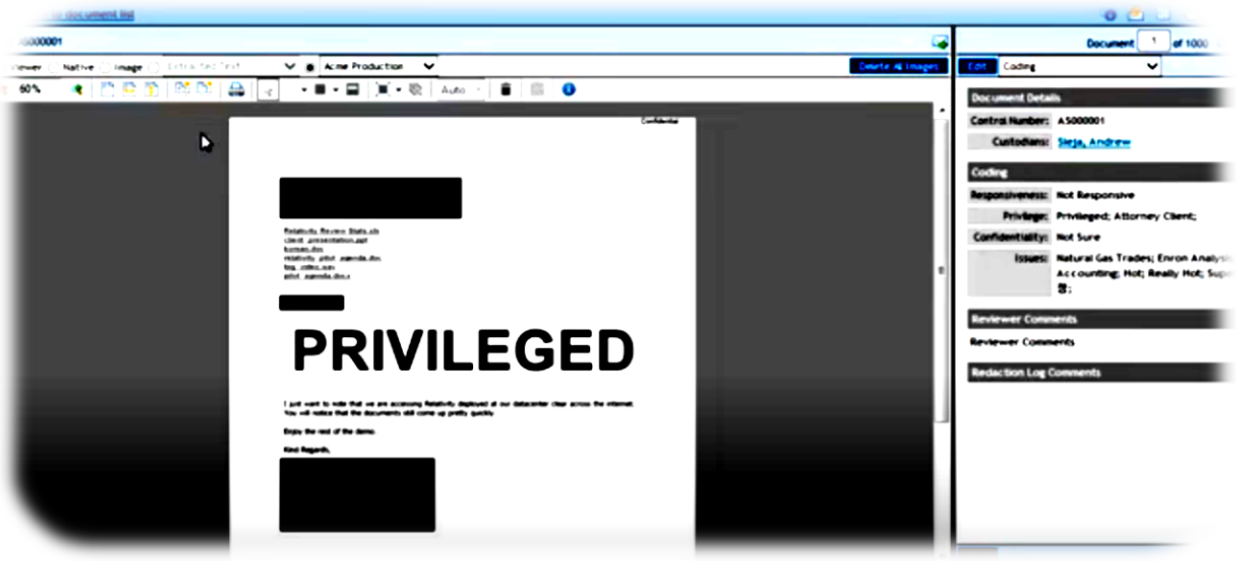
- **Next, you need to put various GUI components called tkinter widgets as per your requirement. Following list describes some common widgets that you may add to the main window called the root window or master window.**

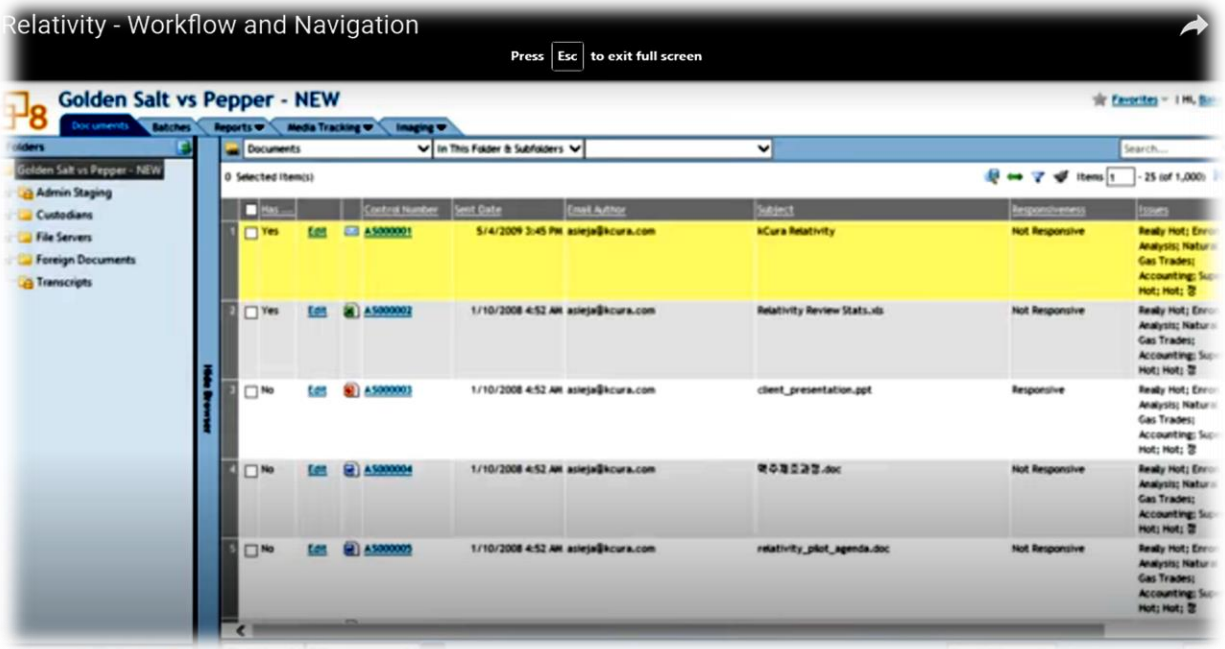
FOR MORE DETAILS ...

RELATIVITY PLATFORM WORKFLOW AND NAVIGATION SCREENSHOTS ARE HERE

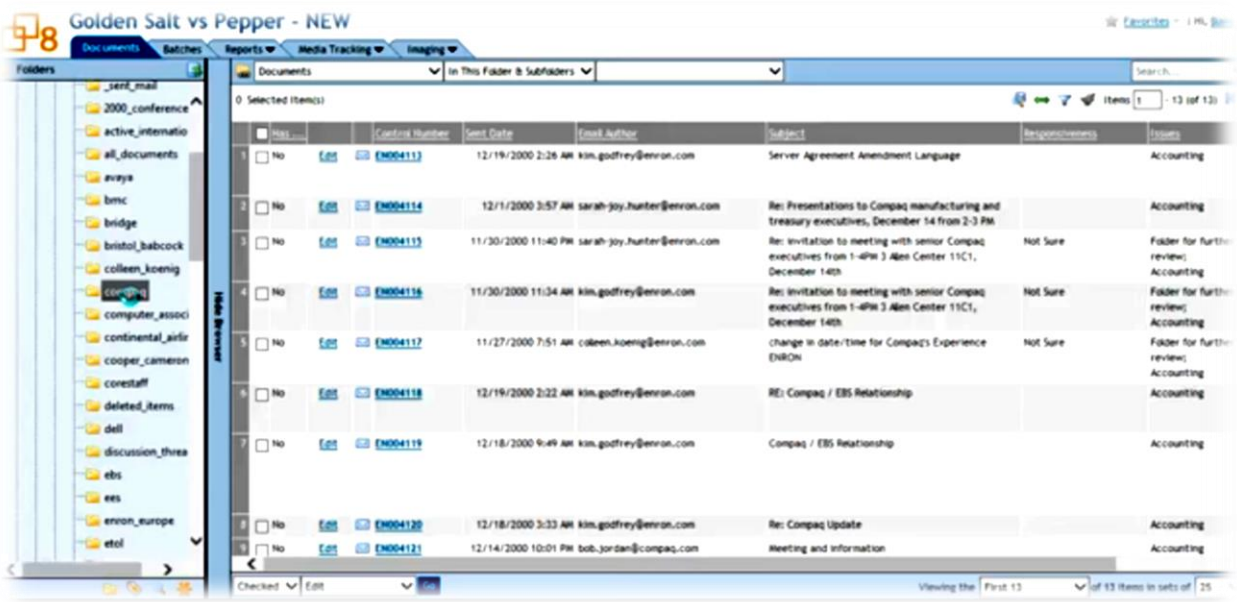


e-ISSN: 2231-5152; p-ISSN: 2249-1796



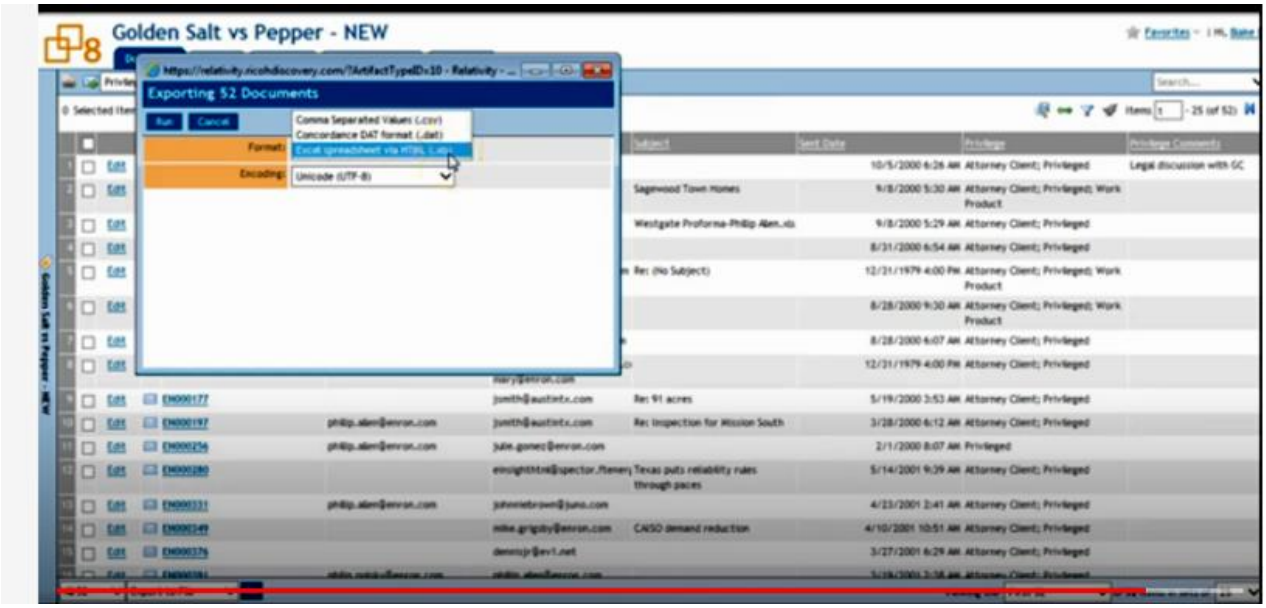


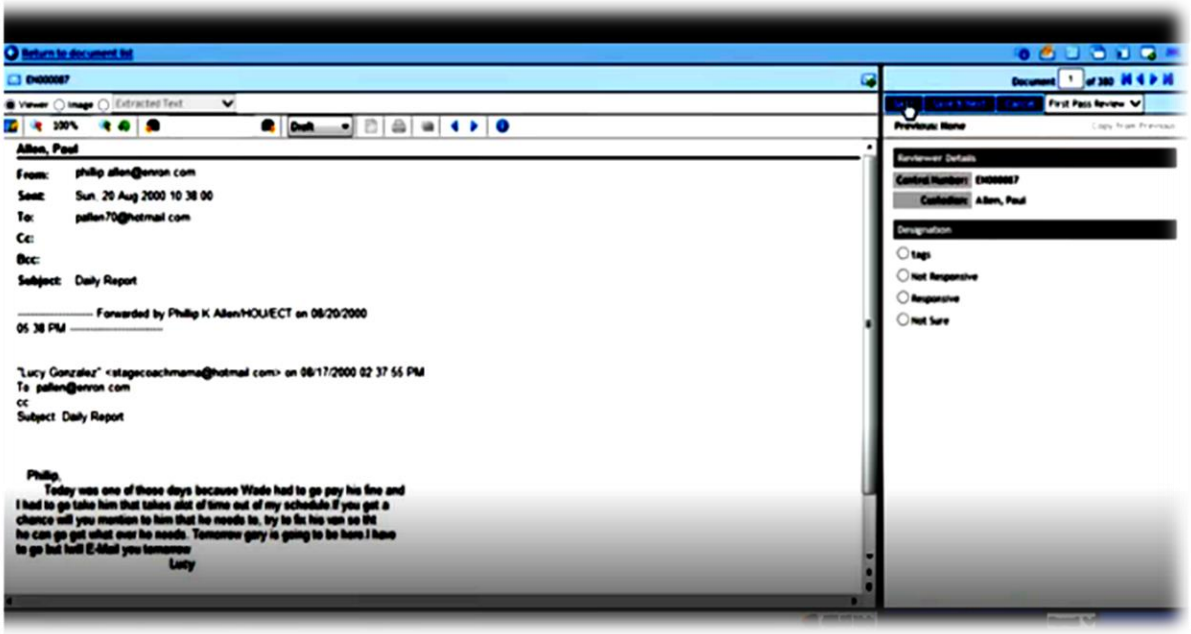
e-ISSN: 2231-5152; p-ISSN: 2249-1796



SCREENSHOT OF EXPORTING DOCUMENTS IN EXL SPREADSHEET DECODING WITH UNICODE

e-ISSN: 2231-5152; p-ISSN: 2249-1796





DOCUMENT REVIEW FOR FIRST LEVEL REVIEWER WHERE IN RIGHT SIDE YOU CAN SEE THE WIDGETS IT CAN BE CREATED BY TKINTER PROGRAMMING.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

XLIV. TECHNICAL UNDERSTANDING FOR TKINTER PROGRAMMING

Tkinter is the standard GUI library for Python. Python when combined with Tkinter provides a fast and easy way to create GUI applications. Tkinter provides a powerful object-oriented interface to the Tk GUI toolkit.

Creating a GUI application using Tkinter is an easy task. All you need to do is perform the following steps −

- Import the *Tkinter* module.
- Create the GUI application main window.
- Add one or more of the above-mentioned widgets to the GUI application.
- Enter the main event loop to take action against each event triggered by the user.

Example

```
#!/usr/bin/python


import Tkinter

top = Tkinter.Tk()

# Code to add widgets will go here...

top.mainloop()
```

This would create a following window −

e-ISSN: 2231-5152; p-ISSN: 2249-1796

XLV. TKINTER WIDGETS

Tkinter provides various controls, such as buttons, labels and text boxes used in a GUI application. These controls are commonly called widgets.

There are currently 15 types of widgets in Tkinter. We present these widgets as well as a brief description in the following table −

Sr.No.	Operator & Description
1	Button The Button widget is used to display buttons in your application.
2	Canvas The Canvas widget is used to draw shapes, such as lines, ovals, polygons and rectangles, in your application.
3	Checkbutton The Checkbutton widget is used to display a number of options as checkboxes. The user can select multiple options at a time.
4	Entry The Entry widget is used to display a single-line text field for accepting values from a user.
5	Frame The Frame widget is used as a container widget to organize other widgets.
6	Label The Label widget is used to provide a single-line caption for other widgets. It can also contain images.
7	Listbox The Listbox widget is used to provide a list of options to a user.
8	Menubutton The Menubutton widget is used to display menus in your application.
9	Menu The Menu widget is used to provide various commands to a user. These commands are contained inside Menubutton.
10	Message The Message widget is used to display multiline text fields for accepting values from a user.
11	Radiobutton

	The Radiobutton widget is used to display a number of options as radio buttons. The user can select only one option at a time.
12	Scale The Scale widget is used to provide a slider widget.
13	Scrollbar The Scrollbar widget is used to add scrolling capability to various widgets, such as list boxes.
14	Text The Text widget is used to display text in multiple lines.
15	Toplevel The Toplevel widget is used to provide a separate window container.
16	Spinbox The Spinbox widget is a variant of the standard Tkinter Entry widget, which can be used to select from a fixed number of values.
17	PanedWindow A PanedWindow is a container widget that may contain any number of panes, arranged horizontally or vertically.
18	LabelFrame A labelframe is a simple container widget. Its primary purpose is to act as a spacer or container for complex window layouts.
19	tkMessageBox This module is used to display message boxes in your applications.

Let us study these widgets in detail −

Standard attributes

Let us take a look at how some of their common attributes. such as sizes, colors and fonts are specified.

- Dimensions
- Colors
- Fonts
- Anchors

e-ISSN: 2231-5152; p-ISSN: 2249-1796

- Relief styles
- Bitmaps
- Cursors

XLVI. GEOMETRY MANAGEMENT

All Tkinter widgets have access to specific geometry management methods, which have the purpose of organizing widgets throughout the parent widget area. Tkinter exposes the following geometry manager classes: pack, grid, and place.

- The *pack()* Method − This geometry manager organizes widgets in blocks before placing them in the parent widget.

Syntax

widget.pack(pack_options)

Here is the list of possible options −

- **expand** − When set to true, widget expands to fill any space not otherwise used in widget's parent.
- **fill** − Determines whether widget fills any extra space allocated to it by the packer, or keeps its own minimal dimensions: NONE (default), X (fill only horizontally), Y (fill only vertically), or BOTH (fill both horizontally and vertically).
- **side** − Determines which side of the parent widget packs against: TOP (default), BOTTOM, LEFT, or RIGHT.

Example

Try the following example by moving cursor on different buttons −

```
from Tkinter import *


root = Tk()

frame = Frame(root)

frame.pack()


bottomframe = Frame(root)
```

```
bottomframe.pack( side = BOTTOM )


redbutton = Button(frame, text="Red", fg="red")

redbutton.pack( side = LEFT)


greenbutton = Button(frame, text="green", fg="green")

greenbutton.pack( side = LEFT )


bluebutton = Button(frame, text="Blue", fg="blue")

bluebutton.pack( side = LEFT )


blackbutton = Button(bottomframe, text="Black", fg="black")

blackbutton.pack( side = BOTTOM)


root.mainloop()
```

When the above code is executed, it produces the following result −

- The *grid()* Method − This geometry manager organizes widgets in a table-like structure in the parent widget.

Syntax

widget.grid(grid_options)

Here is the list of possible options −

- **column** − The column to put widget in; default 0 (leftmost column).
- **columnspan** − How many columns widgetoccupies; default 1.
- **ipadx, ipady** − How many pixels to pad widget, horizontally and vertically, inside widget's borders.
- **padx, pady** − How many pixels to pad widget, horizontally and vertically, outside v's borders.
- **row** − The row to put widget in; default the first row that is still empty.

- **rowspan** − How many rowswidget occupies; default 1.
- **sticky** − What to do if the cell is larger than widget. By default, with sticky='', widget is centered in its cell. sticky may be the string concatenation of zero or more of N, E, S, W, NE, NW, SE, and SW, compass directions indicating the sides and corners of the cell to which widget sticks.

Example

Try the following example by moving cursor on different buttons −

```
import Tkinter

root = Tkinter.Tk(  )

for r in range(3):

   for c in range(4):

      Tkinter.Label(root, text='R%s/C%s'%(r,c),

         borderwidth=1 ).grid(row=r,column=c)

root.mainloop(  )
```

This would produce the following result displaying 12 labels arrayed in a 3 × 4 grid −

- The *place()* Method − This geometry manager organizes widgets by placing them in a specific position in the parent widget.

Syntax

widget.place(place_options)

Here is the list of possible options −

- **anchor** − The exact spot of widget other options refer to: may be N, E, S, W, NE, NW, SE, or SW, compass directions indicating the corners and sides of widget; default is NW (the upper left corner of widget)
- **bordermode** − INSIDE (the default) to indicate that other options refer to the parent's inside (ignoring the parent's border); OUTSIDE otherwise.
- **height, width** − Height and width in pixels.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

- **relheight, relwidth** − Height and width as a float between 0.0 and 1.0, as a fraction of the height and width of the parent widget.
- **relx, rely** − Horizontal and vertical offset as a float between 0.0 and 1.0, as a fraction of the height and width of the parent widget.
- **x, y** − Horizontal and vertical offset in pixels.

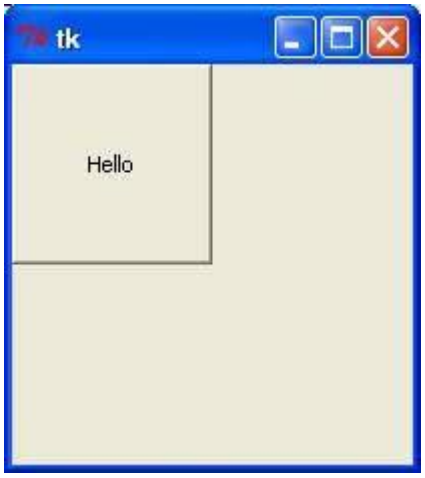
Example

Try the following example by moving cursor on different buttons −

```
from Tkinter import *
import tkMessageBox
import Tkinter

top = Tkinter.Tk()

def helloCallBack():
   tkMessageBox.showinfo("Hello Python", "Hello World")

B = Tkinter.Button(top, text ="Hello", command = helloCallBack)

B.pack()
B.place(bordermode=OUTSIDE, height=100, width=100)
top.mainloop()
```

When the above code is executed, it produces the following result −

e-ISSN: 2231-5152; p-ISSN: 2249-1796



GEOMETRY MANAGEMENT METHODS

Any code that you write using any compiled language like C, C++, or Java can be integrated or imported into another Python script. This code is considered as an "extension."

A Python extension module is nothing more than a normal C library. On Unix machines, these libraries usually end in .so (for shared object). On Windows machines, you typically see .dll (for dynamically linked library).

Pre-Requisites for Writing Extensions

To start writing your extension, you are going to need the Python header files.

- On Unix machines, this usually requires installing a developer-specific package such as python2.5-dev.
- Windows users get these headers as part of the package when they use the binary Python installer.

Additionally, it is assumed that you have good knowledge of C or C++ to write any Python Extension using C programming.

First look at a Python Extension

For your first look at a Python extension module, you need to group your code into four part −

- The header file *Python.h*.
- The C functions you want to expose as the interface from your module.
- A table mapping the names of your functions as Python developers see them to C functions inside the extension module.
- An initialization function.

The Header File *Python.h*

You need include *Python.h* header file in your C source file, which gives you access to the internal Python API used to hook your module into the interpreter.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Make sure to include Python.h before any other headers you might need. You need to follow the includes with the functions you want to call from Python.

XLVII. THE C FUNCTIONS

The signatures of the C implementation of your functions always takes one of the following three forms −

```
static PyObject *MyFunction( PyObject *self, PyObject *args );

static PyObject *MyFunctionWithKeywords(PyObject *self,
                                PyObject *args,
                                PyObject *kw);

static PyObject *MyFunctionWithNoArgs( PyObject *self );
```

Each one of the preceding declarations returns a Python object. There is no such thing as a *void* function in Python as there is in C. If you do not want your functions to return a value, return the C equivalent of Python's None value. The Python headers define a macro, Py_RETURN_NONE that does this for us.

The names of your C functions can be whatever you like as they are never seen outside of the extension module. They are defined as *static* function.

Your C functions usually are named by combining the Python module and function names together, as shown here −

```
static PyObject *module_func(PyObject *self, PyObject *args) {
   /* Do your stuff here. */
   Py_RETURN_NONE;
}
```

This is a Python function called *func* inside of the module *module*. You will be putting pointers to your C functions into the method table for the module that usually comes next in your source code.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

XLVIII. THE METHOD MAPPING TABLE

This method table is a simple array of PyMethodDef structures. That structure looks something like this −

```
struct PyMethodDef {
   char *ml_name;
   PyCFunction ml_meth;
   int ml_flags;
   char *ml_doc;
};
```

Here is the description of the members of this structure −

- ml_name − This is the name of the function as the Python interpreter presents when it is used in Python programs.
- ml_meth − This must be the address to a function that has any one of the signatures described in previous seection.
- ml_flags − This tells the interpreter which of the three signatures ml_meth is using.
    - This flag usually has a value of METH_VARARGS.
    - This flag can be bitwise OR'ed with METH_KEYWORDS if you want to allow keyword arguments into your function.
    - This can also have a value of METH_NOARGS that indicates you do not want to accept any arguments.
- ml_doc − This is the docstring for the function, which could be NULL if you do not feel like writing one.

This table needs to be terminated with a sentinel that consists of NULL and 0 values for the appropriate members.

EXAMPLE

For the above-defined function, we have following method mapping table −

```
static PyMethodDef module_methods[] = {
   { "func", (PyCFunction)module_func, METH_NOARGS, NULL },
   { NULL, NULL, 0, NULL }
};
```

e-ISSN: 2231-5152; p-ISSN: 2249-1796

XLIX. THE INITIALIZATION FUNCTION

The last part of your extension module is the initialization function. This function is called by the Python interpreter when the module is loaded. It is required that the function be named init*Module*, where *Module* is the name of the module.

The initialization function needs to be exported from the library you will be building. The Python headers define PyMODINIT_FUNC to include the appropriate incantations for that to happen for the particular environment in which we're compiling. All you have to do is use it when defining the function.

Your C initialization function generally has the following overall structure –

```
PyMODINIT_FUNC initModule() {
   Py_InitModule3(func, module_methods, "docstring...");
}
```

Here is the description of *Py_InitModule3* function −

- func − This is the function to be exported.
- *module*_methods − This is the mapping table name defined above.
- *docstring* − This is the comment you want to give in your extension.

Putting this all together looks like the following −

```
#include <Python.h>

static PyObject *module_func(PyObject *self, PyObject *args) {
   /* Do your stuff here. */
   Py_RETURN_NONE;
}

static PyMethodDef module_methods[] = {
   { "func", (PyCFunction)module_func, METH_NOARGS, NULL },
   { NULL, NULL, 0, NULL }
};

PyMODINIT_FUNC initModule() {
   Py_InitModule3(func, module_methods, "docstring...");
}
```

EXAMPLE

A simple example that makes use of all the above concepts −

e-ISSN: 2231-5152; p-ISSN: 2249-1796

```
#include <Python.h>

static PyObject* helloworld(PyObject* self) {
   return Py_BuildValue("s", "Hello, Python extensions!!");
}

static char helloworld_docs[] =
   "helloworld( ): Any message you want to put here!!\n";

static PyMethodDef helloworld_funcs[] = {
   {"helloworld", (PyCFunction)helloworld,
      METH_NOARGS, helloworld_docs},
      {NULL}
};

void inithelloworld(void) {
   Py_InitModule3("helloworld", helloworld_funcs,
                  "Extension module example!");
}
```

Here the *Py_BuildValue* function is used to build a Python value. Save above code in hello.c file. We would see how to compile and install this module to be called from Python script.

L. BUILDING AND INSTALLING EXTENSIONS

The *distutils* package makes it very easy to distribute Python modules, both pure Python and extension modules, in a standard way. Modules are distributed in source form and built and installed via a setup script usually called *setup.py* as follows.

For the above module, you need to prepare following setup.py script −

```
from distutils.core import setup, Extension
setup(name='helloworld', version='1.0',  \
      ext_modules=[Extension('helloworld', ['hello.c'])])
```

Now, use the following command, which would perform all needed compilation and linking steps, with the right compiler and linker commands and flags, and copies the resulting dynamic library into an appropriate directory −

```
$ python setup.py install
```

On Unix-based systems, you'll most likely need to run this command as root in order to have permissions to write to the site-packages directory. This usually is not a problem on Windows.

Importing Extensions

Once you installed your extension, you would be able to import and call that extension in your Python script as follows −

e-ISSN: 2231-5152; p-ISSN: 2249-1796

```
#!/usr/bin/python
import helloworld

print helloworld.helloworld()
```

This would produce the following result −

Hello, Python extensions!!

Passing Function Parameters

As you will most likely want to define functions that accept arguments, you can use one of the other signatures for your C functions. For example, following function, that accepts some number of parameters, would be defined like this −

```
static PyObject *module_func(PyObject *self, PyObject *args) {
   /* Parse args and do something interesting here. */
   Py_RETURN_NONE;
}
```

The method table containing an entry for the new function would look like this −

```
static PyMethodDef module_methods[] = {
   { "func", (PyCFunction)module_func, METH_NOARGS, NULL },
   { "func", module_func, METH_VARARGS, NULL },
   { NULL, NULL, 0, NULL }
};
```

You can use API *PyArg_ParseTuple* function to extract the arguments from the one PyObject pointer passed into your C function.

The first argument to PyArg_ParseTuple is the args argument. This is the object you will be *parsing*. The second argument is a format string describing the arguments as you expect them to appear. Each argument is represented by one or more characters in the format string as follows.

```
static PyObject *module_func(PyObject *self, PyObject *args) {
   int i;
   double d;
   char *s;

   if (!PyArg_ParseTuple(args, "ids", &i, &d, &s)) {
      return NULL;
   }

   /* Do something interesting here. */
   Py_RETURN_NONE;
}
```

Compiling the new version of your module and importing it enables you to invoke the new function with any number of arguments of any type −

```
module.func(1, s="three", d=2.0)
```

e-ISSN: 2231-5152; p-ISSN: 2249-1796

```
module.func(i=1, d=2.0, s="three")
module.func(s="three", d=2.0, i=1)
```

You can probably come up with even more variations.

The *PyArg_ParseTuple* Function

Here is the standard signature for PyArg_ParseTuple function −

int PyArg_ParseTuple(PyObject* tuple,char* format,...)

This function returns 0 for errors, and a value not equal to 0 for success. tuple is the PyObject* that was the C function's second argument. Here *format* is a C string that describes mandatory and optional arguments.

Here is a list of format codes for PyArg_ParseTuple function −

Code	C type	Meaning
c	char	A Python string of length 1 becomes a C char.
d	double	A Python float becomes a C double.
f	float	A Python float becomes a C float.
i	int	A Python int becomes a C int.
l	long	A Python int becomes a C long.
L	long long	A Python int becomes a C long long
O	PyObject*	Gets non-NULL borrowed reference to Python argument.
s	char*	Python string without embedded nulls to C char*.
s#	char*+int	Any Python string to C address and length.
t#	char*+int	Read-only single-segment buffer to C address and length.

u	Py_UNICODE*	Python Unicode without embedded nulls to C.
u#	Py_UNICODE*+int	Any Python Unicode C address and length.
w#	char*+int	Read/write single-segment buffer to C address and length.
z	char*	Like s, also accepts None (sets C char* to NULL).
z#	char*+int	Like s#, also accepts None (sets C char* to NULL).
(...)	as per ...	A Python sequence is treated as one argument per item.
|		The following arguments are optional.
:		Format end, followed by function name for error messages.
;		Format end, followed by entire error message text.

Returning Values

Py_BuildValue takes in a format string much like *PyArg_ParseTuple* does. Instead of passing in the addresses of the values you are building, you pass in the actual values. Here's an example showing how to implement an add function –

```
static PyObject *foo_add(PyObject *self, PyObject *args) {
   int a;
   int b;

   if (!PyArg_ParseTuple(args, "ii", &a, &b)) {
      return NULL;
   }
   return Py_BuildValue("i", a + b);
}
```

This is what it would look like if implemented in Python −

def add(a, b):

```
  return (a + b)
```

You can return two values from your function as follows, this would be cauptured using a list in Python.

```
static PyObject *foo_add_subtract(PyObject *self, PyObject *args) {
   int a;
   int b;

   if (!PyArg_ParseTuple(args, "ii", &a, &b)) {
      return NULL;
   }
   return Py_BuildValue("ii", a + b, a - b);
}
```

This is what it would look like if implemented in Python −

```
def add_subtract(a, b):
  return (a + b, a - b)
```

The *Py_BuildValue* Function

Here is the standard signature for Py_BuildValue function −

```
PyObject* Py_BuildValue(char* format,...)
```

Here *format* is a C string that describes the Python object to build. The following arguments of *Py_BuildValue* are C values from which the result is built. The *PyObject** result is a new reference.

Following table lists the commonly used code strings, of which zero or more are joined into string format.

Code	C type	Meaning
c	char	A C char becomes a Python string of length 1.
d	double	A C double becomes a Python float.
f	float	A C float becomes a Python float.
i	int	A C int becomes a Python int.
l	long	A C long becomes a Python int.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

N	PyObject*	Passes a Python object and steals a reference.
O	PyObject*	Passes a Python object and INCREFs it as normal.
O&	convert+void*	Arbitrary conversion
s	char*	C 0-terminated char* to Python string, or NULL to None.
s#	char*+int	C char* and length to Python string, or NULL to None.
u	Py_UNICODE*	C-wide, null-terminated string to Python Unicode, or NULL to None.
u#	Py_UNICODE*+int	C-wide string and length to Python Unicode, or NULL to None.
w#	char*+int	Read/write single-segment buffer to C address and length.
z	char*	Like s, also accepts None (sets C char* to NULL).
z#	char*+int	Like s#, also accepts None (sets C char* to NULL).
(...)	as per ...	Builds Python tuple from C values.
[...]	as per ...	Builds Python list from C values.
{...}	as per ...	Builds Python dictionary from C values, alternating keys and values.

Code {...} builds dictionaries from an even number of C values, alternately keys and values. For example, Py_BuildValue("{issi}",23,"zig","zag",42) returns a dictionary like Python's {23:'zig','zag':42}.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

LI. UNDERSTANDING MORE DETAILS BY ARTIFICIAL INTELLIGENCE

Recent developments in Artificial Intelligence (AI) have stoked new fears about large-scale job loss, stemming from its ability to automate a rapidly expanding set of tasks (including non-routine cognitive tasks), and its potential to affect every sector of the economy.

Furthermore, there are concerns about employee well-being and the broader work environment, linked to the idea that AI may soon become pervasive in the workplace and threaten and undermine humans' place in it. However, AI also has the potential to complement and augment human capabilities, leading to higher productivity, greater demand for human labour and improved job quality.

From a theoretical perspective, the impact of AI on employment and wages is ambiguous, and it may depend strongly on the type of AI being developed and deployed, how it is developed and deployed, and on market conditions and policy. However, the empirical evidence based on AI adopted in the last 10 years does not support the idea of an overall decline in employment and wages in occupations exposed to AI. While AI is capable of performing some non-routine cognitive tasks, some bottlenecks to adoption still remain, and many tasks still require humans to carry them out. Thus, much of the impact of AI on jobs is likely to be experienced through the reorganization of tasks within an occupation. Certain groups of workers may be more capable or better positioned to take advantage of the benefits that AI brings, use AI in a way that is complementary to their work, and avoid its negative impacts.

AI is likely to reshape the work environment of many people, by changing the content and design of their jobs, the way workers interact with each other and with machines, and how work effort and efficiency are monitored. AI can play an important role in facilitating human-machine collaboration, helping workers in the execution of tedious or physically demanding tasks while allowing them to leverage their own uniquely human abilities. However, the same AI applications could also entail significant risks for the work environment, especially if applied badly or with the singular motivation to cut costs.

1. Artificial intelligence (AI) is reshaping economies and societies, offering new products and services, and promising to generate productivity gains through greater efficiency and lower costs. At the same time, AI also raises questions and fuels anxieties about its impact on the labour market and society. Therefore, the purpose of this literature review is to take stock of what is already known about the impact of AI on the labour market, identify gaps in the evidence base and inform research

2. An AI system is a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations or decisions influencing real or virtual environments. It uses machine and/or human-based inputs to perceive real and/or virtual environments; abstract such perceptions into models (in an automated manner e.g. with machine learning (ML) or manually); and use model inference to formulate options for information or action. AI systems are designed to operate with varying levels of autonomy.

3. "Ethical issues arising from AI implementation at the workplace and associated policy challenges"" (OECD, 2021)

4. Recent trends in AI and its adoption in the workplace Coined as a term in 1956, AI has evolved from symbolic AI where humans built logic-based systems, through the AI "winter" of the 1970s to the chess-playing computer

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Deep Blue in the 1990s. Over the past few years, the availability of big data, cloud computing and the associated computational and storage capacity and breakthroughs in an AI technology called "machine learning" (ML), have dramatically increased the power, availability, growth and impact of AI. Continuing technological progress is also leading to better and cheaper sensors, which capture more-reliable data for use by AI systems.

5. The OECD report "Artificial Intelligence in Society" describes these developments in more detail (OECD, 2019[3]) ML is a set of techniques to allow machines to learn in an automated manner through patterns and inferences from data rather than through explicit instructions from a human. ML approaches often teach machines to reach an outcome by showing them many examples of correct outcomes. However, they can also define a set of rules and let the machine learn by trial and error. The technology driving the current wave of ML applications is a sophisticated statistical modelling technique called "neural networks", which involve repeatedly interconnecting thousands or millions of simple transformations into a larger statistical machine that can learn sophisticated relationships between inputs and outputs. Beyond large and established players in the technology sector, industry adoption of AI is at an early stage. A US-based nationally representative firm survey (Beede et al., 2020[10]) shows low adoption rates for AI-related technologies such as machine learning, machine vision, natural language processing and automated guided vehicles. Industries leading in AI adoption include high tech, automotive and assembly, telecoms, transport and logistics, financial services and consumer packaged goods, retail and healthcare (based on surveys by Bessen et al. (2018[11]) and McKinsey (2019[12])). The same studies show that AI tends to be embedded in technologies such as natural language understanding and text analysis, natural language classification and decision management, visual recognition (including image, face and video) and virtual agents or conversational interfaces ("chatbots") and robotic process automation.

Whether AI has a positive or negative impact on jobs, one would expect the impact to be strongest in occupations or sectors that rely most on the tasks that AI can carry out. Researchers measure exposure using various methods:

A. Webb (2020[23]) identifies AI patents (i.e. those with keywords such as "supervised learning" and "reinforcement learning" together with "neural network" and "deep learning" in their titles or abstracts) and then assesses the overlap (in verb-noun pairs4) between the text of the patents and the text of job task descriptions (from the O*NET database of occupations and tasks) in order to see which occupations are most exposed to AI.

B. Felten et al. (2019[24]) map (with the help of some computer science PhD students) different AI categories (such as abstract strategy games, translation and image recognition) to skills (from the O*NET database), in order to assess which occupations, rely on abilities where most AI progress has been seen.

C. Brynjolfsson et al. (2018[25]) identify tasks (from the O*NET database) and occupations (using Burning Glass data) suitable for AI by applying a rubric which includes parameters such as: whether the task is describable with rules; whether it requires complex, abstract reasoning; and whether it is highly routine and repeated frequently.

Another example, is the use of AI-enabled virtual reality in production processes enabling workers and robots to work together safely via interactive interfaces that augment human precision and perception

e-ISSN: 2231-5152; p-ISSN: 2249-1796

AI applications in Human Resource Management (HRM) and career development

I. **Humu's Nudge Engine** - Ongoing and personalised coaching for employees and managers using insight from behavioural sciences and occupational psychology. Uses machine learning to customise hints and suggestions. e.g. what timing, messaging, and motivational techniques are effective for each employee.

II. **Dristi's video**-enabled productivity monitoring Increases efficiency along assembly lines by identifying weaknesses and inefficiencies on the factory floor. Image recognition software converts videos of workers along the assembly line to data points for use in a user-friendly app

III. **Humanyze's** wearable devices Employees wear "sociometric" badges that record communication patterns so that feedback on teamwork can be given .AI-enabled analytics identify weaknesses in communication patterns. e.g. based on tone of voice, gesturing, frequency of interruption HireVu's facial recognition software. Analyses recorded interviews to make the hiring process more efficient Image recognition software analyses facial expression, body language and word choice filter to assist with selection.

IV. **IBM's predictive attrition program** Predicts whether an employee is likely to leave the company so that managers can take strategic action IBM's AI platform, Watson, makes predictions based on a wide variety of data points.

V. **U.S. Army's chatbot** recruiter Answers questions about the army's recruiting process and refers users to human recruiters when necessary.

VI. **NLP-enabled chatbot** speaks with potential recruits using the same language and style as an army recruiter.

VII. **Jobiri's resume builder** Builds CVs and cover letters for jobseekers. AI algorithm evaluates CVs and provides customised feedback.

VIII. **Instant Coach Flight Simulator** Enables individuals to practice skills in between training sessions A chatbot provides a private setting for individuals to practice skills, including difficult, dangerous or embarrassing ones.

IX. **IBM's Blue Matching** Delivers personalised internal job recommendations to IBM employees on a voluntary basis. Predictive analytics generate recommendations that fit employees' qualifications, aspirations and AI inferred skills.

LII. NATURAL LANGUAGE PROCESSING: DEFINITION

This is about Natural Language Processing. By "natural language" we mean a language that is used for everyday communication by humans; languages such as English, Hindi, or Portuguese. In contrast to artificial languages such as programming languages and mathematical notations, natural languages have evolved as they pass from generation to generation, and are hard to pin down with explicit rules.

We will take Natural Language Processing—or NLP for short—in a wide sense to cover any kind of computer manipulation of natural language. At one extreme, it could be as simple as counting word frequencies to compare different writing styles. At the other extreme, NLP involves "understanding" complete human utterances, at least to the extent of being able to give useful responses to them. Technologies based on NLP are becoming

e-ISSN: 2231-5152; p-ISSN: 2249-1796

increasingly widespread. For example, phones and handheld computers support predictive text and handwriting recognition; web search engines give access to information locked up in unstructured text; machine translation allows us to retrieve texts written in Chinese and read them in Spanish. By providing more natural human-machine interfaces, and more sophisticated access to stored information, language processing has come to play a central role in the multilingual information society.

LIII. WHY PYTHON?

Python is also versatile and widely used in every technical field, such as Machine Learning, Artificial Intelligence, Web Development, Mobile Application, Desktop Application, Scientific Calculation, etc.

Usage of Python

Python is a general purpose, open source, high-level programming language and also provides number of libraries and frameworks. Python has gained popularity because of its simplicity, easy syntax and user-friendly environment. The usage of Python as follows.

Desktop Applications

Web Applications

Data Science

Artificial Intelligence

Machine Learning

Scientific Computing

Robotics

Internet of Things (IoT)

Gaming

Mobile Apps

Data Analysis and Preprocessing

Data Analysis and Processing

Artificial Intelligence

Games

Hardware/Sensor/Robots

Desktop Applications

You can start with the small projects such as calculator app, a tic-toc-toe game, an alarm clock app, a to-do list, student or customer management system, etc.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Once you get handy with a small project, you can easily shift toward your interesting domain (Machine Learning, Web Development, etc.).

One of the friendly things about Python is that it allows you to type directly into the interactive interpreter—the program that will be running your Python programs. You can access the Python interpreter using a simple graphical interface called the Interactive Development Environment (IDLE). The interpreter will print a blurb about your Python version; simply check that

you are running Python 2.4 or 2.5 (here it is 2.5.1):

Python 2.5.1 (r251:54863, Apr 15 2008, 22:57:26)

[GCC 4.0.1 (Apple Inc. build 5465)] on darwin

Type "help", "copyright", "credits" or "license" for more information.

>>>

LIBRARIES

TensorFlow - It is an artificial intelligence library which allows us to create large scale AI based projects.

Django - It is an open source framework that allows us to develop web applications. It is easy, flexible, and simple to manage.

Flask - It is also an open source web framework. It is used to develop lightweight web applications.

Pandas - It is a Python library which is used to perform scientific computations.

Keras - It is an open source library, which is used to work around the neural network.

Python Applications

Python is known for its general-purpose nature that makes it applicable in almost every domain of software development. Python makes its presence in every emerging field. It is the fastest-growing programming language and can develop any application.

Here, we are specifying application areas where Python can be applied.

Python Applications

1) Web Applications

We can use Python to develop web applications. It provides libraries to handle internet protocols such as HTML and XML, JSON, Email processing, request, beautifulSoup, Feedparser, etc. One of Python web-framework named Django is used on Instagram. Python provides many useful frameworks, and these are given below:

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Django and Pyramid framework(Use for heavy applications)

Flask and Bottle (Micro-framework)

Plone and Django CMS (Advance Content management)

2) Desktop GUI Applications

The GUI stands for the Graphical User Interface, which provides a smooth interaction to any application. Python provides a Tk GUI library to develop a user interface. Some popular GUI libraries are given below.

Tkinter or Tk

wxWidgetM

Kivy (used for writing multitouch applications)

PyQt or Pyside

3) Console-based Application

Console-based applications run from the command-line or shell. These applications are computer program which are used commands to execute. This kind of application was more popular in the old generation of computers. Python can develop this kind of application very effectively. It is famous for having REPL, which means the Read-Eval-Print Loop that makes it the most suitable language for the command-line applications.

Python provides many free library or module which helps to build the command-line apps. The necessary IO libraries are used to read and write. It helps to parse argument and create console help text out-of-the-box. There are also advance libraries that can develop independent console apps.

4) Software Development

Python is useful for the software development process. It works as a support language and can be used to build control and management, testing, etc.

SCons is used to build control.

Buildbot and Apache Gumps are used for automated continuous compilation and testing.

Round or Trac for bug tracking and project management.

5) Scientific and Numeric

This is the era of Artificial intelligence where the machine can perform the task the same as the human. Python language is the most suitable language for Artificial intelligence or machine learning. It consists of many scientific and mathematical libraries, which makes easy to solve complex calculations.

Implementing machine learning algorithms require complex mathematical calculation. Python has many libraries for scientific and numeric such as Numpy, Pandas, Scipy, Scikit-learn, etc. If you have some basic knowledge of Python, you need to import libraries on the top of the code. Few popular frameworks of machine libraries are given below.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

SciPy

Scikit-learn

NumPy

Pandas

Matplotlib

6) Business Applications

Business Applications differ from standard applications. E-commerce and ERP are an example of a business application. This kind of application requires extensively, scalability and readability, and Python provides all these features.

Oddo is an example of the all-in-one Python-based application which offers a range of business applications. Python provides a Tryton platform which is used to develop the business application.

7) Audio or Video-based Applications

Python is flexible to perform multiple tasks and can be used to create multimedia applications. Some multimedia applications which are made by using Python are TimPlayer, cplay, etc. The few multimedia libraries are given below.

Gstreamer

Pyglet

QT Phonon

8) 3D CAD Applications

The CAD (Computer-aided design) is used to design engineering related architecture. It is used to develop the 3D representation of a part of a system. Python can create a 3D CAD application by using the following functionalities.

Fandango (Popular)

CAMVOX

HeeksCNC

AnyCAD

RCAM

e-ISSN: 2231-5152; p-ISSN: 2249-1796

9) Enterprise Applications

Python can be used to create applications that can be used within an Enterprise or an Organization. Some real-time applications are OpenERP, Tryton, Picalo, etc.

10) Image Processing Application

Python contains many libraries that are used to work with the image. The image can be manipulated according to our requirements. Some libraries of image processing are given below.

OpenCV

Pillow

SimpleITK

In this topic, we have described all types of applications where Python plays an essential role in the development of these applications. In the next tutorial, we will learn more concepts about Python.

Oddo is an example of the all-in-one Python-based application which offers a range of business applications. Python provides a Tryton platform which is used to develop the business application.

Python is a simple yet powerful programming language with excellent functionality for processing linguistic data.

Here is a five-line Python program that processes *file.txt* and prints all the words ending

in ing:

```
>>> for line in open("file.txt"):
... for word in line.split():
... if word.endswith('ing'):
... print word
```

This program illustrates some of the main features of Python. First, whitespace is used to *nest* lines of code; thus the line starting with if falls inside the scope of the previous line starting with for; this ensures that the ing test is performed for each word.

Second, Python is *object-oriented*; each variable is an entity that has certain defined attributes and methods.

For example, the value of the variable line is more than a sequence of characters. It is a string object that has a "method" (or operation) called split() that we can use to break a line into its words. To apply a method to an object, we write the object name, followed by a period, followed by the method name, i.e., line.split().

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Third, methods have *arguments* expressed inside parentheses. For instance, in the example, word.ends with('ing') had the argument 'ing' to indicate that we wanted words ending with *ing* and not something else.

Finally—and most importantly—Python is highly readable, so much so that it is fairly easy to guess what this program does even if you have never written a program before.

We chose Python because it has a shallow learning curve, its syntax and semantics are transparent, and it has good string-handling functionality. As an interpreted language, Python facilitates interactive exploration. As an object-oriented language, Python permits data and methods to be encapsulated and re-used easily. As a dynamic language, Python permits attributes to be added to objects on the fly, and permits variables to be typed dynamically, facilitating rapid development. Python comes with an extensive standard library, including components for graphical programming, numerical processing, and web connectivity.

Python Features

Python provides many useful features which make it popular and valuable from the other programming languages. It supports object-oriented programming, procedural programming approaches and provides dynamic memory allocation. We have listed below a few essential features.

1) Easy to Learn and Use

Python is easy to learn as compared to other programming languages. Its syntax is straightforward and much the same as the English language. There is no use of the semicolon or curly-bracket, the indentation defines the code block. It is the recommended programming language for beginners.

2) Expressive Language

Python can perform complex tasks using a few lines of code. A simple example, the hello world program you simply type print("Hello World"). It will take only one line to execute, while Java or C takes multiple lines.

3) **Interpreted Language**

Python is an interpreted language; it means the Python program is executed one line at a time. The advantage of being interpreted language, it makes debugging easy and portable.

4) Cross-platform Language

Python can run equally on different platforms such as Windows, Linux, UNIX, and Macintosh, etc. So, we can say that Python is a portable language. It enables programmers to develop the software for several competing platforms by writing a program only once.

5) Free and Open Source

Python is freely available for everyone. It is freely available on its official website www.python.org. It has a large community across the world that is dedicatedly working towards make new python modules and functions.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Anyone can contribute to the Python community. The open-source means, "Anyone can download its source code without paying any penny."

6) Object-Oriented Language

Python supports object-oriented language and concepts of classes and objects come into existence. It supports inheritance, polymorphism, and encapsulation, etc. The object-oriented procedure helps to programmer to write reusable code and develop applications in less code.

7) Extensible

It implies that other languages such as C/C++ can be used to compile the code and thus it can be used further in our Python code. It converts the program into byte code, and any platform can use that byte code.

8) Large Standard Library

It provides a vast range of libraries for the various fields such as machine learning, web developer, and also for the scripting. There are various machine learning libraries, such as Tensor flow, Pandas, Numpy, Keras, and Pytorch, etc. Django, flask, pyramids are the popular framework for Python web development.

9) **GUI Programming Support**

Graphical User Interface is used for the developing Desktop application. PyQT5, Tkinter, Kivy are the libraries which are used for developing the web application.

10) **Integrated**

It can be easily integrated with languages like C, C++, and JAVA, etc. Python runs code line by line like C,C++ Java. It makes easy to debug the code.

11. Embeddable

The code of the other programming language can use in the Python source code. We can use Python source code in another programming language as well. It can embed other language into our code.

12. **Dynamic Memory Allocation**

In Python, we don't need to specify the data-type of the variable. When we assign some value to the variable, it automatically allocates the memory to the variable at run time. Suppose we are assigned integer value 15 to x, then we don't need to write int x = 15. Just write x = 15.

Software Requirements

Python

NumPy (recommended)

This is a scientific computing library with support for multidimensional arrays and linear algebra, required for certain probability, tagging, clustering, and classification tasks.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Matplotlib (recommended)

This is a 2D plotting library for data visualization, and is used in some of the book's code samples that produce line graphs and bar charts.

NetworkX (optional)

This is a library for storing and manipulating network structures consisting of nodes and edges. For visualizing semantic networks, also install the Graphviz library.

Prover9 (optional)

This is an automated theorem prover for first-order and equational logic, used to support inference in language processing.

LIV. PYCHARM

It is an integrated development environment used in computer programming, specifically for the Python language.

Python Variables

Variable is a name that is used to refer to memory location. Python variable is also known as an identifier and used to hold value.

In Python, we don't need to specify the type of variable because Python is a infer language and smart enough to get variable type.

Variable names can be a group of both the letters and digits, but they have to begin with a letter or an underscore.

It is recommended to use lowercase letters for the variable name. Rahul and rahul both are two different variables.

Identifier Naming

Variables are the example of identifiers. An Identifier is used to identify the literals used in the program. The rules to name an identifier are given below.

The first character of the variable must be an alphabet or underscore (_).

All the characters except the first character may be an alphabet of lower-case(a-z), upper-case (A-Z), underscore, or digit (0-9).

Identifier name must not contain any white-space, or special character (!, @, #, %, ^, &, *).

Identifier name must not be similar to any keyword defined in the language.

Identifier names are case sensitive; for example, my name, and MyName is not the same.

Examples of valid identifiers: a123, _n, n_9, etc.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Examples of invalid identifiers: 1a, n%4, n 9, etc.

Declaring Variable and Assigning Values

Python does not bind us to declare a variable before using it in the application. It allows us to create a variable at the required time.

We don't need to declare explicitly variable in Python. When we assign any value to the variable, that variable is declared automatically.

The equal (=) operator is used to assign value to a variable.

Object References

It is necessary to understand how the Python interpreter works when we declare a variable. The process of treating variables is somewhat different from many other programming languages.

Python is the highly object-oriented programming language; that's why every data item belongs to a specific type of class. Consider the following example.

Python doesn't have long int or float data types. It treats all integer values as an int data type. Here, the question arises. What is the maximum possible value can hold by the variable in Python? Consider the following example.

Example -

```
# A Python program to display that we can store

# large numbers in Python


a = 10000000000000000000000000000000000000000000

a = a + 1

print(type(a))

print (a)
```

Output:

```
<class 'int'>

10000000000000000000000000000000000000000000001
```

As we can see in the above example, we assigned a large integer value to variable x and checked its type. It printed class <int> not long int. Hence, there is no limitation number by bits and we can expand to the limit of our memory.

Python doesn't have any special data type to store larger numbers.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Basic Fundamentals:

This section contains the fundamentals of Python, such as:

i)Tokens and their types.

ii) Comments

a)Tokens: The tokens can be defined as a punctuator mark, reserved words, and each word in a statement.

The token is the smallest unit inside the given program.

There are following tokens in Python:

Keywords.

Identifiers.

Literals.

Operators.

Python Literals

Python Literals can be defined as data that is given in a variable or constant.

Python supports the following literals:

1. String literals:

String literals can be formed by enclosing a text in the quotes. We can use both single as well as double quotes to create a string.

Example:

"Aman" , '12345'

Types of Strings:

There are two types of Strings supported in Python:

a) Single-line String- Strings that are terminated within a single-line are known as Single line Strings.

Example:

text1='hello'

e-ISSN: 2231-5152; p-ISSN: 2249-1796

b) Multi-line String - A piece of text that is written in multiple lines is known as multiple lines string.

There are two ways to create multiline strings:

1) Adding black slash at the end of each line.

Example:

```
text1='hello\
user'
print(text1)
'hellouser'
```

2) Using triple quotation marks:-

Example:

```
str2="""welcome
to
SSSIT"'
print str2
```

Output:

```
welcome
to
SSSIT
```

II. Numeric literals:

Numeric Literals are immutable. Numeric literals can belong to following four different numerical types.

Int(signed integers) Long(long integers) float(floating point) Complex(complex)

Numbers(can be both positive and negative) with no fractional part.eg: 100 Integers of unlimited size followed by lowercase or uppercase L eg: 87032845L Real numbers with both integer and fractional part eg: -26.2 In the form of a+bj where a forms the real part and b forms the imaginary part of the complex number. eg: 3.14j

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Example - Numeric Literals

```
x = 0b10100 #Binary Literals
y = 100 #Decimal Literal
z = 0o215 #Octal Literal
u = 0x12d #Hexadecimal Literal

#Float Literal
float_1 = 100.5
float_2 = 1.5e2

#Complex Literal
a = 5+3.14j

print(x, y, z, u)
print(float_1, float_2)
print(a, a.imag, a.real)
```

Output:

```
20 100 141 301
100.5 150.0
(5+3.14j) 3.14 5.0
```

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Boolean literals:

A Boolean literal can have any of the two values: True or False.

Example - Boolean Literals

```
x = (1 == True)
y = (2 == False)
z = (3 == True)
a = True + 10
b = False + 10


print("x is", x)
print("y is", y)
print("z is", z)
print("a:", a)
print("b:", b)
```

Output:

```
x is True
y is False
z is False
a: 11
b: 10
```

e-ISSN: 2231-5152; p-ISSN: 2249-1796

IV. Special literals.

Python contains one special literal i.e., None.

None is used to specify to that field that is not created. It is also used for the end of lists in Python.

Example - Special Literals

```
val1=10
val2=None
print(val1)
print(val2)
```

Output:

10

None

V. Literal Collections.

Python provides the four types of literal collection such as List literals, Tuple literals, Dict literals, and Set literals.

LIST:

List contains items of different data types. Lists are mutable i.e., modifiable.

The values stored in List are separated by comma(,) and enclosed within square brackets([]). We can store different types of data in a List.

Example - List literals

```
list=['John',678,20.4,'Peter']
list1=[456,'Andrew']
print(list)
print(list + list1)
```

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Output:

```
['John', 678, 20.4, 'Peter']
['John', 678, 20.4, 'Peter', 456, 'Andrew']
```

Dictionary:

Python dictionary stores the data in the key-value pair.

It is enclosed by curly-braces {} and each pair is separated by the commas(,).

Example

```
dict = {'name': 'Pater', 'Age':18,'Roll_nu':101}
print(dict)
```

Output:

```
{'name': 'Pater', 'Age': 18, 'Roll_nu': 101}
```

Tuple:

Python tuple is a collection of different data-type. It is immutable which means it cannot be modified after creation.

It is enclosed by the parentheses () and each element is separated by the comma(,).

Example

```
tup = (10,20,"Dev",[2,3,4])
print(tup)
```

Output:

```
(10, 20, 'Dev', [2, 3, 4])
```

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Set:

Python set is the collection of the unordered dataset.

It is enclosed by the {} and each element is separated by the comma(,).

Example: - Set Literals

```
set = {'apple','grapes','guava','papaya'}

print(set)
```

Output:

```
{'guava', 'apple', 'papaya', 'grapes'}
```

LV. AI: AS A METHODOLOGY

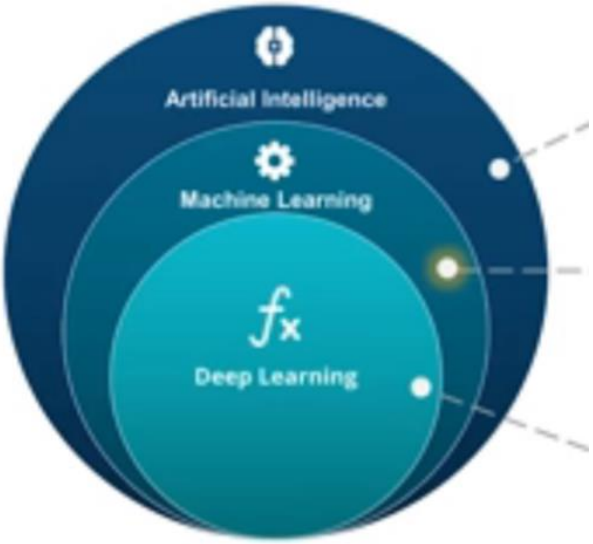
It is a vast of field. Under ARTIFICIAL INTELLIGENCE we have MACHINE LEARNING, we have NLP, we have expert systems, and we have image recognition, object detection and so on. So, ARTIFICIAL INTELLIGENCE is sort of a process or it is a methodology in which you make machines, mimic the behavior of human beings.
MACHINE LEARNING is a way in which you feed a lot of data to a machine, so that it can make depth decision.

ARTIFICIAL INTELLIGENCE

THERE ARE THREE DOMAINS

1. AI
2. MACHINE LEARNING
3. DEEP LEARNING

e-ISSN: 2231-5152; p-ISSN: 2249-1796



WHAT IS ARTIFICIAL INTELLIGENCE?

JOHN MC CARTHY DEFINES AI AS THE SCIENCE AND ENGINEERING OF MAKING INTELLIGENT MACHINES. THE THEORY AND DEVELOPMENT OF COMPUTER SYSTEM IS ABLE TO PERFORM TASKS NORMALLY REQUIRING HUMAN INTELLIGENCE SUCH AS VISUAL PERCEPTION, SPEECH RECOGNITION, DECISION MAKING AND TRANSLATION BETWEEN LANGUAGES.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

DEMAND FOR AI

1 - MORE COMPUTATIONAL - RECENTLY, MANY ADVANCES HAVE BEEN MADE AND COMPLEX DEEP LEARNING MODELS ARE DEPLOYED. AND ONE OF THE GREATEST TECHNOLOGIES THAT MADE THIS POSSIBLE IS GPU'S.

2 - MORE DATA - WE ARE GENERATING DATA AT AN IMMEASURABLE PACE. WE ARE GENERATING DATA THROUGH SOCIAL MEDIA THROUGH IOT DEVICES.

EVERY POSSIBLE WAY THERE IS LOT OF DATA, SO WE NEED TO FIND A METHOD OR A SOLUTION THAT CAN HELP US PROCESS THIS MUCH DATA CAN HELP US PROCESS THIS MUCH DATA AND HELP US DERIVE TO USEFUL INSIGHT, SO THAT WE CAN GROW BUSINESS WITH THE HELP OF DATA.

SO THAT PROCESS IS BASICALLY AI.

SO IN ORDER TO HAVE A USEFUL AI AGENT TO SMART DECISION LIKE TELLING WHICH ITEM TO RECOMMEND NEXT,

WHEN YOU SHOP ONLINE OR HOW TO CLASSIFIED AN OBJECT FROM AN IMAGE.

AI IS TRAINED ON LARGE DATA SETS, AND BIG DATA ENABLE US TO DO THIS MORE EFFICIENTLY. NEXT REASON IS NOW WE HAVE BETTER ALGORITHMS.

RIGHT NOW WE HAVE VERY EFFECTIVE ALGORITHMS WHICH ARE BASED ON NEURAL NETWORKS. NEURAL NETWORKS ARE THE CONCEPT BEHIND DEEP LEARNING. SINCE WE HAVE BETTER ALGORITHM WHICH CAN DO BETTER COMPUTATIONS AND QUICKER COMPUTATIONS WITH MORE ACCURACY, THE DEMAND FOR AI HAS INCREASED.

AI IS A TECHNIQUE WHICH ENABLES MACHINE TO MIMIC HUMAN BEHAVIOR.

- Systems that act like humans
- Systems that think like humans
- System that think rationally
- Systems that act rationally/intelligently

Through this, we are going to focus on systems that act rationally, i.e., the creation, design and implementation of rational agents.

The definitions might be framed so as to reflect so far as possible the normal use of the words, but this attitude cannot be dangerous, If the meaning of the words "machine" and "think" are to be found by examining how they are commonly used. It is easy to escape the conclusion that the meaning and the answer to the question, "Can machines think?" is to be sought in Criminal Cases such as criminal investigations. Criminal Investigations are closely related to it and is expressed in relatively unambiguous words.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

(Details are given in the first thrilling investigative series on Indian Television, C.I.D. and Agent Raghav. These series consist of hard - core procedural stories dealing with investigation, detection, and suspense and analysis.

LVI. A PSYCHOLOGICAL ANALYSIS OF HUMAN BAHAVIOUR

A psychological analysis of human behaviour helps you to search criminals around you. This research is designed mathematically, scientifically, geographically in interesting way An important feature of a learning machine is that its teacher will often be very largely ignorant of quite what is going on inside, although he may still be able to some extent to predict his pupil's behavior. This should apply most strongly to the later education of a machine arising from a child machine of well-tried design (or programme). This is in clear contrast with normal procedure when using a machine to do computations one's object is then to have a clear mental picture of the state of the machine at each moment in the computation. This object can only be achieved with a struggle. The view that "the machine can only do what we know how to order it to do,'" appears strange in face of this. Most of the programmes which we can put into the machine will result in its doing something that we cannot make sense (if at all, or which we regard as completely random behaviour. Intelligent behaviour presumably consists in a departure from the completely disciplined behaviour involved in computation, but a rather slight one, which does not give rise to random behaviour, or to pointless repetitive loops. Another important result of preparing our machine for its part in the imitation game by a process of teaching and learning is that "human fallibility" is likely to be omitted in a rather natural way, i.e., without special "coaching." (The reader should reconcile this with the point of view on pages 23 and 24.) Processes that are learnt do not produce a hundred per cent certainty of result; if they did, they could not be unlearnt.

AN ESSENTIAL UNPREDICTABILITY IN HUMAN BEHAVIOR

A classic example is to be found in the history of psychology itself; with the advent of behaviorism and the experimental approach in general, the prediction was often made by the modernists that the old armchair introspectionist method would never get anywhere because it was incompatible with the quantitative objective tools of modern science. And so it came to pass, if we are to believe the current histories of psychology.

But even this coin has another side. For the actual success of the experimental method in psychology in producing an axiomatic theory has so far been very much less than its earlier proponents expected. It is perhaps worth examining pessi- pessimistic prophecies about the prospects of the new Newtonian kind of psychology. Such prophecies are by no means new, and have attended the subject since birth, an event which—depending on one’s point of view—occurred with Aristotle, Wundt, Pavlov, or Hull. Various reasons have been given for such pessimism. Human beings were alleged to transcend the kind of approach that was so successful with inanimate objects; they had souls, or free will, or required empathic understanding. We can safely say that these skeptical forecasts were *largely* based on beliefs which have not turned out to be well supported. But they are *partly* based on an instinctive appreciation of some sound points.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

A formal statement of one underlying truth that is closely related to these doctrines. To place it in context, I add that I think it is only one of several points that can be made in support of the view that the appropriate model for psychology is totally unlike Newtonian physics, that absurdly simple and atypical branch of science, and is much more like geology or geography with their limited developmental theories covering only the broad outlines of events and a mass of organized but non-lawlike information, much of it quite restricted in application.

To use individual cases for examples: as an insurance agent, I turn down, out of hand, the subject's application for automobile collision coverage after reviewing his extremely unsatisfactory record. The cognitive result is the same as if I announce my prediction; I believe, and he knows I believe, that he will probably have another serious accident. Thus, my belief, a prediction, may lead him to take more care and so prove me and it wrong. This is in many ways the same process that the simple seldep instigates.

Second example: I act in a way that makes it clear that I have made *some* prediction, but not clear *what* prediction it is, for instance, I smirk and say knowingly, "I know what you are going to do about marrying that girl, even if *you* don't." The subject may ignore this and proceed as he would have done anyway. But it may be the case that the importance to him of showing me wrong is greater than any gains he can make by making his choice on the intrinsic merit of the alternatives (a common situation in cards, business, love, and war). I shall say that a subject whose utility-set is under this constraint is contra predictive, or is contra predictively motivated, or is a contra predictive. (This is not at all the same as, though it overlaps with, being counter suggestible.)

Then a good strategy for him is to use a randomizer to determine his choice. If there are n alternatives open to him, this makes my chance of predictive success only 1/n which is presumably worse than it was. In principle, some randomizers are predictable (for instance, dice), but this is an uninteresting sense of "in principle" for the working scientist. Moreover, we can readily use a quantum randomizer, which is in principle unpredictable (on what I judge to be the best-supported current view of quantum theory).

So far we merely demonstrate that human choice behavior can be made at least as unpredictable as any physical system. In an important class of examples (which includes the last class), a stronger conclusion is demonstrable.

Third example: It may be that I do not indicate to the subject that I have made a prediction about his behavior, but that he suspects I may have done so—and is contrapredictively, motivated at the time. His best strategy here (and in the preceding case) is to replicate my prediction, if he can. He. may already know, or be able to infer, what I know about him; from this he draws any predictive conclusions that are possible. Then, of course, he acts so as to falsify my prediction. This strategy yields a gain in expected utility Δu (over the randomizing strategy) which is of course given by the formula $\Delta u = u/n$, where u is the utility of surprise, and is thus diminishingly important for choices between an increasing number of alternatives.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

PRINCIPLE

Some randomizers are predictable (for instance, dice), but this is an uninteresting sense of "in principle" for the working scientist. Moreover, we can readily use a quantum randomizer, which is in principle unpredictable (on what I judge to be the best-supported current view of quantum theory). In the absence of access to such devices, it is comparatively easy to invent an ad hoc mental or physical randomizing procedure which will select a digit or letter in a way no more predictable than a roulette wheel. So far we merely demonstrate that human choice behavior can be made at least as unpredictable as any physical system. In an important class of examples (which includes the last class), a stronger conclusion is demonstrable. Third example: It may be that I do not indicate to the subject that I have made a prediction about his behavior, but that he suspects I may have done so—and is contrapredictively, motivated at the time. His best strategy here (and in the preceding case) is to replicate my prediction, if he can. He. may already know, or be able to infer, what I know about him; from this he draws any predictive conclusions that are possible. Then, of course, he acts so as to falsify my prediction. This strategy yields a gain in expected utility Δu (over the randomizing strategy) which is of course given by the formula $\Delta u = u/n$, where u is the utility of surprise, and is thus diminishingly important for choices between an increasing number of alternatives.

If the utility of surprise varies from alternative to alternative, being ui for the ithalternative, $\Delta u = ui /n$, and may therefore be larger for larger n.

SIGNIFICANCE

The idea that human behavior is "in principle" predictable is not seriously affected by the recognition that one may not be able to announce the predictions to the subjects with impunity (nor, more generally, can one allow them to be discovered). For one can make the predictions and keep them from the subjects. But in the present case, one *cannot make true predictions at all*. Secret predictions are still predictions; unmakable ones are not.

The behavior of an intelligent contrapredictive with adequate computer resources will never be more predictable than the best randomizer he can get hold of; but it is *absolutely* unpredictable, that is, the available data yields *no* predictive conclusion at all, unless certain very special conditions are met, namely, (i) the contrapredictive incorrectly believes he knows all the relevant data the predictor possesses about him; (ii) this presumed data implies a definite prediction (which *usually* means it does not include the fact of contrapredictive motivation); (iii) the data the predictor *actually* has enables him to predict the subject's behavior under conditions (i) and (ii).

For in any other case, the fact of contrapredictivity automatically nullifies any prediction the remaining data may imply, and also any implied by that fact *and* the other data.

PRECISE FORMULATION

Assume a rational intelligent predictor, P, whose task is to infer from information Ic the choice of an individual C, where

C is choosing rationally and intelligently (that is, so as to maximize expectations of utility) between alternatives a1, a2, w w w an, ($n \geq 2$) (that is, is physically capable of each [would do it if he decided to] and must do one).

e-ISSN: 2231-5152; p-ISSN: 2249-1796

C is a contrapredictive relative to P and ai, that is, wishes to falsify any prediction made by P about his choice. Precisely, if ūi is the utility for C of ai if ai is predicted by P, and u is the utility for C of picking an unpredicted a, then "C is a contrapredictive" = "u > [max ūi - min ūi]." The formula for the more general case, where u depends on the alternative chosen, is min(ūi + ui) > max ūi.

It is possible to regard this as the definition of strong contrapredictivity and discuss a weaker notion involving the probabilities Pi that P will predict ai.

(iii) C knows that Ic is P's data and C has sufficient facilities to calculate any consequences of Ic with respect to C's forthcoming choice, prior to the time he must make the choice.

It immediately follows that Ic either implies an incorrect prediction as to which ai will be chosen by C (that is, contains false information) or none: hence C's choice cannot be rationally predicted by P from Ic.

For assume the contrary: If C(am) = C will choose am (definition) then the assumption gives us: (a) Ic → C(am) for some m; (b) C(am) is true. Now C will know that P, since rational and accepting Ic , is making the prediction C(am) (from (i) and (iii)). Hence C will in fact choose another alternative ap, p ≠ m. Hence C(am) is false, contrary to the assumption. Hence either Ic does not imply C(am) for any m or C(am) is false.

CLARIFICATIONS

A. "But much behavior is *already* known to be predictable, even when the prediction is known, for example, that of the compulsive, or the rational benevolent man, etc." Granted: as long as condition (ii) does not apply, the theorem does not apply. (Other unpredictabilities: (i) K. R. Popper has suggested interesting similar results in other cases; (ii) quantum-uncertainty-dependent behavior.)

B. "Something *must* cause the eventual decision in the contrapredictive; and if we had enough knowledge, we would know what it is, and the effect it has."

Something does (in so far as determinism is true), but *what* it is, or rather what *effect* it has, we cannot know *in advance.* We could know it later, and this capacity for explanation is what I take determinism to mean: if it means "inferential predictability in principle," the theorem proves it false (see 4H and SD below).

"But *we* can precisely predict C's behavior; C will always do the opposite of what P predicts."

The prediction task of the theorem is prediction of the precise alternative which C selects. Of course, for other prediction tasks, this result does not apply.

For example, we can always predict that C will pick *some* a_i*; this* is guaranteed by (i). And we can predict with great confidence (for large *n*) that C will pick an a_i such that $1 \leq i \leq n - 1$; or that he will not pick a_n. As the information content goes down, the confidence level goes up, and vice versa. But the theorem tells us we can never achieve *high* confidence in a *highly specific* prediction, which is of course the kind we would usually prefer to be able to make. If P predicts C(a_m), we as third parties can still only predict "Not C(a_m)," which has vanishingly small information content for increasing *n.*

e-ISSN: 2231-5152; p-ISSN: 2249-1796

2. Moreover, P can't predict *anything* if he knows C is contra predictive, unless he also knows C to be badly wrong as to what I_C is, so we never even get situation 1 in the important cases.

3. Even if P does predict something in the sense of selecting some a_m without proof, C can still actually do a_m since C knows P can't be rationally *sure* of C(a_m).

D. "The proof assumes C's rationality, which is unrealistic."

1. The objection is irrelevant since the theorem can be taken as a limit theorem for rational methods; one does not raise a serious objection to the third law of thermodynamics (that absolute zero is unattainable) by saying "It practically never gets that cold."

2. If C is likely to be irrational, so is P; hence C is still likely to be unpredicted because P does not fully utilize his data.

3. There are in fact many practical occasions when the degree of rationality required is available and the theorem then represents a relevant practical consideration. .

E. "Stochastic strategies are immune to publicity; hence the theorem only applies to exact prediction."

But C can falsify predictions about the statistical properties of his choice behavior just as easily as individual predictions: for example, if P concludes C will,

r% of the time, choose an a_m where $1 \leq m \leq n/2$, then C can choose such an a_m just(100 - *r*)% of the time.

F. "One can't *prove* C is unpredictable; for P may just guess correctly or be a precognitive or prophet."

1. Guessing is not a procedure of predictive inference, since we cannot know when the guess is correct, that is, can have no confidence in predictions generated in this way. The theorem only refers to the impossibility of rational (correct) prediction, predictions in which we can have confidence.

2. If P finds his "guesses" are *significantly* more effective than they would be by chance alone, that is, that he can rationally have confidence in them, he has discovered a new fact about himself *and about* C, that P is a good instrument for predicting C's choices. This will—it could be argued—be part of I_C , hence C will know it. But this alone does not enable C to evade the prediction. Now we can plausibly take reliable intuition as a limit case of inference where the content of the intuition is itself part of the data, and this will then reduce to the case of announcing the prediction to C. Of course, a Helmholtzian would argue that P must be performing an *unconscious* inference. This is a misleading account in some ways, but it suggests an important distinction between supernatural precognition and supernormal prescience. The expert clinician's prognoses are not inferences, nor are they normal perceptions—but nor are they supernatural.

His brain is absorbing information and converting it into a prediction using a learned though not known transformation principle; if we cut him off from perceptual access to the patient or the patient's charts or his own past experience, he will fail. A prognostic computer operated by a medically naive technician has the same dependency on stored information, so we may argue that the clinician and the technician are using this data in getting to their prediction, though not in a process of explicit inference which they themselves perform. I shall henceforth regard this as encompassed by the phraseology of the theorem preamble: "infer from

e-ISSN: 2231-5152; p-ISSN: 2249-1796

information I_C" is to mean "explicitly deduce or infer from data I_C by means of laws, skills, or devices that incorporate transforming principles I_C $(I_C = I'_C + I''_C)$."

The crystal ball, however, operates in a different way. It does not require a data input, merely reflecting the shadows that coming events cast before them. And the same is true of the "true prophet," or the parapsychologist's precognitive. There is an *experimentum crucis* to distinguish the precognition from prescience; it is that used by the parapsychologists: can the agent predict events that are either fully random themselves, or determined by random events? If so, his powers are supernatural. The theorem, thus interpreted, applies to all prediction other than supernatural. As long as P's skill is inexplicable (but not supernatural), I_C will be un- known and hence the theorem cannot be applied since C cannot be in possession of I_C. Of course, he may still be able to duplicate P's prediction by finding a matching predictor P′; and he is highly secure in a random strategy. Thus, one consequence of replacing the idea of inferential prediction with that of using information to generate predictions is to put the P with a mysterious skill in the same category as the P with mysterious data; he can succeed only so long as the mystery is continued.

We conclude by stressing that making a rational prediction using a mysterious skill or instrument requires a testing period to establish the reliability of the "instrument," even if it is oneself. Supposing the instrument has a "pointer error," for example, indicates C(a_j) whenever C actually chooses a_{j+i}. This emerges in such a trial period and is no handicap at all: and one might plausibly argue that, pointer error or none, the trial period establishes a correlational law from which together with subsequent pointer readings, the later predictions are *inferred*. If so, law and readings must be regarded as part of I_C, and the earlier argument is unnecessary.

3. The above considerations have three interesting incidental consequences. (a)

The term "data" should be distinguished from the term "information" since the latter is here used to include laws that are not inferable from data in any systematic way. A computer may have the same data as another and not be able to generate the same predictions because it has not hit upon the same generalizations.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

IN THEOREM,

I_C *includes* all information, including any well-confirmed generalizations which is essentially required for generating P's predictions. The fact remains that a brilliant computer or psychologist is the best weapon for getting one-up in the prediction war: a new insight is a new predicting algorithm, and like a new theorem, it tells us something we did not know and hence gives us new information, though it is not based on new data. (b) In the philosophical discussion of determinism, that doctrine has frequently been defined as predictability-in-principle. Now, a precognitive can by definition reliably predict anything, including the most random possible sequences, yet I think it unsatisfactory to suppose the existence of such a being would demonstrate determinism (an argument can be given, but it can be made very implausible by experimental ingenuity). I think determinism is much more nearly connected with predictions that use information. It is too narrow to require that the process be explicit: the existence of a prescient as defined above still shows determinism to be true. I give reasons below for thinking even nonsupernatural predictability-in-principle too strong a definition of determinism, but for forward- looking philosophers the present distinction is of some importance. (c) A mysterious predicting gadget may work perfectly during the trial period, but yet must failthereafter, if I_C includes all the information from which P predicts. For during the trial, its readings are not an adequate basis for prediction and hence are not part of I_C: but thereafter, when they would yield good predictions in normal circumstances, they will not under the conditions of the theorem. The instrument, because it works, now must fail. This *ad hoc* way of falsifying predictions is reminiscent of the Maxwell demon's properties, and the peculiar defining characteristics of the Einstein- Podolski-Rosen *Gedankenexperiment.*

G. "A *third* person P′ watching the P-C affair, can—in principle—predict everything that goes on, using the fact of contrapredictivity plus P's predictability."

Not if C is contrapredictive relative to P′ and knows what P′ knows about C, that is, not unless P′ breaks condition (ii) or (iii). And objections from objection C above also apply. Of course, C will have to decide whether making P′ wrong is more important than making P wrong, for $n = 2$; in general, C can only falsify one less predictors than he has alternatives.

H. "None of this really proves unpredictability, became that means the possibility

of predictability by *someone*—if necessary, someone who *has* knowledge C doesn't know he has."

But Gödel's theorem is not a proof that a certain specific formulas not provable in any system; it is a proof that for certain common and important types of system, however they are strengthened, there is *at every given stage* an unprovable formula. The present proof is that under certain common and socially important conditions, as well as under certain ideal conditions (see 5D), however much is known about subject's behavior, there are certain parts of it that will not be predictable. Increases in knowledge will make predictions possible; but with respect to each such increase in I_C, there will be new predictions which will be impossible. It seems not unreasonable to say this is an essential unpredictability in the same way that an essential unprovability is demonstrated by Gödel's proof.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

I. **"The proof begs the question; everything is packed into the 'free will'assumption that someone *can* do the opposite of whatever is covertly predicted of him by another. If we really knew *all* about a person, he would *have* to do what we predicted—or else we *wouldn't* know all about him."**

I now undertake to prove the "free will assumption" for my own case. Notice first that it is here only necessary to demonstrate that, no matter what prediction is *announced,* I can do the opposite: for in the case where a prediction is made but not announced, I know what it is by replication (the possibility of which is guaranteed by the conditions) and hence am able to announce it myself, or have it announced to me, without change in the information parameters of the situation. Now we locate a predictor and we assign him the prediction task of saying whether I will turn my head left or right. He does not have very much information about me, but *even if he knew everything that can be known,* he would still have to predict either left or right. *By merely guessing, he has one chance in two of making the same prediction as if he were omniscient.* He makes his guess, and—to compensate for the fact that I would have been able to infer it—announces it. I then do the opposite. Now, if he had really had all the information, it might be that it would have led to the opposite prediction, which I would then have known to be his prediction. So the fact that I prove I can falsify his first prediction does not prove I could have falsified the correct prediction. But now there is only one chance in two of this. Let us continue the experiment, using the same prediction task. Many variables have changed significantly, but once again, there are only two possibilities. The predictor guesses again, or uses a randomizer to select one alternative. Once more I falsify his prediction. There is now only one chance in four he has not, on one of these occasions, made the same prediction as an omniscient psychologist. But I am not frozen by either prediction. We continue, and thus prove to any significance level that I have "free will" in this sense.

Of course, the point is obvious enough on other grounds since it is merely the claim that a man can be so sensitized as to respond with behavior B to the stimulus "You will do A" and conversely, which is a fairly trivial feat.

But psychologists sometimes succumb to the "experimented demonstration" more readily.

It can here be noted that since full knowledge cannot lead to a correct prediction of a similarly informed contrapredictive, it cannot lead to any prediction at all (since false conclusions would imply false premises, that is, the "knowledge" would not be knowledge). Hence, the maximum possible knowledge the predictor can have of C cannot provide grounds for prediction. This is the limit version of the theorem.

J. "The result is easily circumvented since any psychologist knows that an observer can easily learn more about a subject than the subject knows about himself."

1. Knowing more may be easy, but knowing more in a direction that pays off in better predictions is more difficult and often impossible for the particular kind of choice we are trying to predict, for instance, whether to bluff at poker, what deployment of forces an unknown enemy strategist will select, and other non neurotic cases.

2. What one observer can learn, another may; so the contra predictive would obviously have to employ his own observers to study his own behavior, from whom he may be able to replicate the predictor's prediction, if any, and act so as to falsify it.

K. "To be realistic, C is quite likely to be wrong in his estimate of what P knows about him, and then the proof doesn't apply."

Such errors are likely to reveal themselves if P acts on his predictions of C, say, in a limited war situation. C then improves his replication or defensively moves to a random strategy. (A rider of this is that if P does acquire covert, predictively effective data about C, he should hold off using it until a very large gain is available by doing so, since he sacrifices later success when he does.) Whenever P has, for example, the results of standard tests done by C, plus public psychological theory about interpretation of these, the proof applies in full force, as to many cases of less data and of more. C can frequently but not always pursue optimum strategy by giving the benefit of any doubts as to the content I_C, and including the doubtful items.

L. "In view of the risk of underestimating the predictor's knowledge, the

minimax strategy for C will usually be a wholly random choice between a_1 w w w a_n."

1. It is not only underestimating, but overestimating that is risky. A relatively ignorant P may have data which happens to imply that C will do what he actually does do, because C has assumed that P had more knowledge which would have indicated a different choice.

2. C's best strategy will indeed depend on (a) the likelihood of error in his

estimate of P's data, and also on (b) the disparity between u and the set u_1 w w w u_n, (c) the relative sizes of the u_i and (d) the size of n. He does take a risk by switching from a fully random strategy; but he generally has a chance of gain by doing so.

3. In general, where I_C includes the fact that C is contrapredictive, it cannot imply any specific prediction, hence errors in estimating I_C by C are unimportant since it has no consequences over this range. P will have to guess, and C knows this. It is no solution for P to weight his guesses with C's utility weights since C can ignore them.

SPECIAL APPLICATIONS

C = computer.

The proof demonstrates that physical determinism is either false or does not imply predictability-in-principle of all systems (contra Laplace).

The motivational condition of contrapredictivity is a simple matter to program, and the parity of information easily arranged. K. R. Popper has given a most extensive—and a very interesting—treatment of limitations on determinism that arise from taking seriously the fact that the predicting computer is itself a physical system. His results are related to the present ones, but by no means the same; we develop these by taking seriously the fact that the predictee may be contrapredictively motivated.

In the early discussions of the contrapredictive effect, it was commonly thought to be unique to the social sciences. We have just observed its applicability to computers which might be thought to count against

this; but I have argued elsewhere that the social sciences will ultimately include the study of molar computer behavior (Scriven, 1960).

However, even as it *was originally defined,* the effect applies throughout science. The prediction that a comet will return on a certain date may provoke a successful effort to intercept and destroy it. What is unique to the social sciences is only that their predictions are often falsified by the action of those to whose behavior the prediction refers (directly, or indirectly as in bank and crop predictions). The contrapredictive effect, however, as I have tried to demonstrate, has some of its most interesting manifestations where no prediction is or can be generated at all; hence it is a more general concept than the self-defeating (published) prediction.

C = P. The problem whether one could ever know in advance how one was going to decide is a nice dilemma for determinists, and this aspect of the problem has been treated most illuminatingly by D. M. MacKay in many writings, with somewhat different conclusions from my own. His emphasis has been on the impossibility of the predictee's *believing* the predictions about his choices made by any observer including himself; I have discussed the impossibility of the observer even *inferring* a prediction under certain (narrower) conditions, a result which is stronger in one way, but more limited in its range (weaker) in another. The emphasis of the discussions by Popper, MacKay and myself is thus *primarily* on three kinds of ultimate limitations on predictions; computer limitations, belief limitations, and inference limitations. The existentialists have also sensed the logical indispensability of the act of genuine choice, despite determinism; and of course many others have felt this so acutely as to conclude that determinism must be false.

But I do not think MacKay's denial that a single true account is possible, or the existentialist's nihilism, or the libertarian's antideterminism are required.

The idea that determinism implies total predictability is, on this and other grounds indefensible and must be rejected. Taking it to mean only the universal rule of some kind of exact laws, it is falsified by quantum actions but not by the present argument (contrary to Paul Shiman's interesting suggestion which stimulated my thinking on this point).

In particular, exact *explanation* of human and computer actions is perfectly possible inprinciple although prediction is not, quantum effects apart. However, it is another question whether it is always worth searching for such explanations, or indeed practically possible to find them. I think the task of the social sciences is largely elsewhere, and (perforce) largely outside the prediction field. We could put the present point by saying that rational contrapredictive behavior is probably perpetually "emergent," that is, generates new "laws"; at any rate, new phenomena. At each stage we have to appeal to a higher element in the hierarchy of laws than any we have yet discovered; yet it can be an exact law, and it can be in turn explained. Atemporal laws are not necessary for explanation.

3. P = God. God can know what we will do only by preventing us from knowing what he knows, or depriving us of "free will" in the sense of the capacity for contrapredictive motivation. Thus his omniscience to some degree limits his exercise of omnipotence or benevolence. The theorem does show that monotheism is the only form of theism reconcilable with omniscience, under certain obvious conditions.

4. I_C = All possible information about C, that is, the ultimate goal of individual psychology. As for the mechanical and the supernatural predictors, so for the human ones. The present proof shows that psychology

e-ISSN: 2231-5152; p-ISSN: 2249-1796

can never get to the point where its practitioners know enough to predict all the behavior of other psychologists, even if they could predict the behavior of all physical randomizers. Conversely, to insist that *predictive* determinism is true is to insist that it is impossible for some knowledge about C to be conveyed to him: which I take to be an empirical and false claim.

LVII. GREEK MYTHOLOGY

TALOS WAS A GIANT ANIMATED BRONZE WARRIOR PROGRAMMED TO GUARD THE ISLAND. 1950 - ALAN TURING PUBLISHED A LANDMARK PAPER IN WHICH HE SPECULATED ABOUT THE POSSIBILITY OF CREATIVE MACHINES THAT THINK. SO HE CREATED WHAT IS KNOWN AS THE TURING TEST. THE TEST IS BASICALLY USED TO DETERMINE WHETHER OR NOT A COMPUTER CAN THINK INTELLIGENTLY LIKES A HUMAN BEING. HE NOTED THAT THINKING IS DIFFICULT TO DEFINE AND DEVISED HIS FAMOUS TURING TEST SO, BASICALLY, IF A MACHINE CAN CARRY OUT A CONVERSATION WITH A HUMAN BEING. IT WAS REASONABLE TO SAY THAT THE MACHINE IS THINKING. IT MEANS THAT THE MACHINE WILL PASS THE TURING TEST. SO, THE TURING TEST WAS ACTUALLY THE FIRST SERIOUS PROPOSAL.

DISCUSSION OF THE 1950 PAPER BY ALAN TURING THAT PROPOSED WHAT IS NOW CALLED THE TURING TEST. THIS IS ONE OF THE MOST IMPACTFUL PAPERS IN THE HISTORY OF AI AND THE FIRST PAPER IN THE AI PAPER CLUB ON OUR DISCORD.

WE HAVE AI SYSTEMS ALL AROUND US THAT CAN PERFORM IMPRESSIVE TASKS, BUT ARE THEY PRACTICAL IN TERMS OF ENERGY EFFICIENCY? IN THIS BRIEF TALK; SAMUEL BOSCH, A BRIGHT YOUNG RESEARCHER, SHARES HIS WORKS ON ENERGY-EFFICIENT COMPUTING AND MACHINE LEARNING. HE NOT ONLY DISCUSSES WHY WE NEED TO CONSIDER PRACTICALITY ISSUES IN THIS SENSE BUT ALSO PROVIDES US WITH A VISION FOR MACHINE LEARNING IN THE FUTURE.

LVIII. BASIC CONFIGURATION

There will be a human Interrogator on one side of wall and other side a machine and human. Machine has certain Knowledge base (set of rules) and human.

If human Machine intelligent when human interrogator cannot distinguish response given by machine and human.

MAJOR COMPONENTS -

- NLP: To enable it to communicate successfully in English.
- Knowledge Representation: To store what it knows or hears
- Automated Reasoning: To use the stored information to answer questions and to draw conclusions.
- MACHINE LEARNING: To adapt to new circumstances and to detect and extrapolate patterns

e-ISSN: 2231-5152; p-ISSN: 2249-1796

TUURING TEST ALSO INCLUDES:

- Computer Vision: To perceive objects
- Robotics: To manipulate objects and move about

THINKING HUMANLY: COGNITION

- Expressing the Theory of Mind as a Computer Program (introspection, psychological experiments, brain imaging)

1. GPS (Global Problem Solver) (Newell & Simon 1961) does not only need to solve the problems but should human thought process.
   - Requires scientific theories of internal acting of a brain.
2. Cognitive Science: the study of thinking, learning, language and mental organization of human psychology and behavior. For Example - Weather
3. Cognitive Neuroscience: is the study of biological processes and aspects which underline cognition.

THINKING HUMANLY - COGNITIVE SCIENCE

- We need to know the internal working of brain
- What level of abstraction? "knowledge" or "circus"
- How to validate? It requires
- ✓ Predicting and testing human behavior
- ✓ Direct identification from neurological data
- The available theories in cognitive science yet do not explain anything resembling human - level general intelligence.

THINKING RATIONALLY - LAWS OF THOUGHT

- ARISTOTLE AND OTHER GREEK SCHOOLS DEVELOPED VARIOUS FORMS OF LOGIC
- NOTATIONS AND RULES OF DERIVATION FOR THOUGHT
- DIRECT LINE THROUGH MATH AND PHILOSOPHY TO MODERN AI
- Problems:
- ✓ Not all intelligent behavior is mediated by logical deliberation
- ✓ What is the purpose of thinking? What thought should ?I have out of all thoughts that I could have?

THINKING RATIONALLY: "Laws of Thought"

- Aristotle: First to codify " right thinking"
- Several Greek schools developed various forms of logic:
- Notation and rules of derivation for thoughts.

- By 1965, programs existed that could, in principle, solve and solvable problem described in logical notation.

- Problems;

- ✓ Not easy to state informal knowledge in logical notation (less than 100% certAin)
- ✓ Big difference between solving a problem" In principle" and solving it" In practice"
- ✓ Problems with just a few hundred facts can exhaust the computational resources of any computer

ACTING RATIONALLY: RATIONAL AGENT

- ✓ RATIONAL BEHAVIOUR: DOING THE RIGHT THING
- ✓ The right thing: The optimal (best) thing that is expected to maximize the chances of achieving a set of goals, in a given situation
- ✓ Making correct inferences is sometimes part of being a rational agent.

ACTING RATIONALLY

- ✓ Does not necessarily involve thinking
- ✓ Example - blinking reflex - but thinking should be in the service of rational action.
- ✓ Applying breaks while driving when suddenly something comes on the road.

AI COVERS

(ENGINEERING, COMPUTER STUDIES, LINGUISTICS, NEUROSCIENCE, PSYCHOLOGY, AND MATHEMATICS)

IN PHILOSOPHY, AI FOLLOWED BY THE ERA OF 1951. THIS WAS ALSO KNOWN AS THE GAME AI. SO IN 1951, BY USING THE FERRANTI MARK I MACHINE OF THE UNIVERSITY OF MANCHESTER A COMPUTER SCIENTIST KNOWN AS CHRISTOPHER STRACHEY, WROTE A CHECKERS PROGRAM AND AT THE SAME TIME, A PROGRAMME WAS WRITTEN FOR CHESS AS WELL. NOW, THESE PROGRAMS WERE LATER IMPROVED AND REDONE, BUT, THIS WAS FIRST ATTEMPT AT CREATING PROGRAM THAT COULD PLAY CHESS OR THAT WOULD COMPETE WITH HUMANS IN PLAYING CHESS. THIS IS FOLLOWED BY 1956. NOW THIS IS PROBABLY THE IMPORTANT YEAR IN THE INVENTION OF AI. BECAUSE IN THE 1956. THE TERM AI WAS COINED. SO THE TERM AI WAS COINED BY JOHN MCCARTHY AT THE DARTMOUTH CONFERENCE IN 1956.

IN 1959 FIRST AI LABORATORY WAS ESTABLISHED.

IN 1951 - GAME AI

IN 1956 - BIRTH

IN 1961 - FIRST CHATBOT - THE FIRST AI CHATBOT CALLED ELIZA WAS INTRODUCED IN 1961.

In 1997 - IBM DEEP BLUE

e-ISSN: 2231-5152; p-ISSN: 2249-1796

IBM DEEP BLUE BEATS WORLD CHAMPION GARRY KASPAROV IN THE GAME OF CHESS.

- ✓ NO HANDS ACROSS AMERICA DRIVING AUTONOMOUSLY 98% OF THE TIME FROM PITTSBURGH TO SAN DIEGO.
- ✓ During the 1991 Gulf War, US forces deployed an AI logistics planning and scheduling program that involved up to 50,000 vehicles, cargo, and people
- ✓ In 2011 IBM's Watson defeated 2 champions of famous US TV game Jeopardy
- ✓ NASA's on board autonomous planning program controlled the scheduling of operations for a spacecraft
- ✓ Proverb solves crossword puzzles better than most humans.

LIX. NATURAL LANGUAGE PROCESSING

1- **Speech Technologies**

- ✓ Automatic speech recognition (ASR)
- ✓ Text- to - speech synthesis (TTS)
- ✓ Dialog systems

2 - Language Processing Technologies

- ✓ Machine Translation
- ✓ Information Extraction
- ✓ Information Retrieval
- ✓ Text classification, Spam filtering.

3. Robotics
4. Others

COMPUTER VISION

- ➢ Object and character recognition
- ➢ Image classification
- ➢ Scenario Reconstruction etc.

GAME PLAYING

- ➢ **Strategy/FPS games, Deep Blue etc.**

LOGIC-BASED PROGRAMS

- ➢ Proving Theorems
- ➢ Reasoning etc.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

AI APPLICATIONS

GOOGLE PREDICTIVE SEARCH ENGINE -WHEN YOU BEGIN TYPING A SEARCH TERM AND GOOGLE MAKES RECOMMENDATIONS FOR YOU TO CHOOSE FROM, THAT IS AI IN ACTION. SO, PREDICTIVE SEARCHES ARE BASED ON DATA THAT GOOGLE COLLECTS ABOUT YOU, SUCH AS YOUR BROWSER HISTORY, YOUR LOCATIONS, YOUR AGE, AND OTHER PERSONAL DETAILS. SO BY USING AI, GOOGLE ATTEMPTS TO GUESS WHAT YOU MIGHT BE TRYING TO FIND. NOW BEHIND THIS THERE IS A LOT OF NATURAL LANGUAGE PROCESSING, DEEP LEARNING, AND MACHINE LEARNING INVOLVED. IT IS NOT EASY TO CREATE SEARCH ENGINE BUT THE LOGIC BEHIND IS ARTIFICIAL INTELLIGENCE.

J.P. MORGAN

J.P. MORGAN CHASE'S CONTRACT INTELLIGENCE PLATFORM (COIN) –

PLATFORM USES AI, MACHINE LEARNING, AND IMAGE RECOGNITION SOFTWARE TO ANALYZE LEGAL DOCUMENTS.

MANUALLY REVIEWING AROUND12, 000 AGREEMENTS TOTAL OVER 36,000 HOURS BUT AS SOON AS THIS TASK WAS REPLACED BY AI MACHINE, IT WAS ABLE TO DO THIS IN A MATTER OF SECONDS THAT IS THE DIFFERENCE BETWEEN AI AND MANUAL HUMAN WORK. EVEN THOUGH AI CANNOT THINK AND REASON LIKE HUMANS, BUT THEIR COMPUTATIONAL POWER IS VERY STRONG COMPARED TO HUMANS BECAUSE THE MACHINE LEARNING ALGORITHM, DEEP LEARNING CONCEPTS AND NATURAL LANGUAGE PROCESSING, AI HAS REACH A STAGE WHEREIN IT CAN COMPUTE THE MOST COMPLEX TO COMPLEX PROBLEM IN A MATTER OF SECONDS.

IBM WATSON

HEALTHCARE ORGANIZATION - Health care Organizations use IBM AI (WATSON) technology for medical diagnosis.

IBM has developed AI software, specifically for medicine.

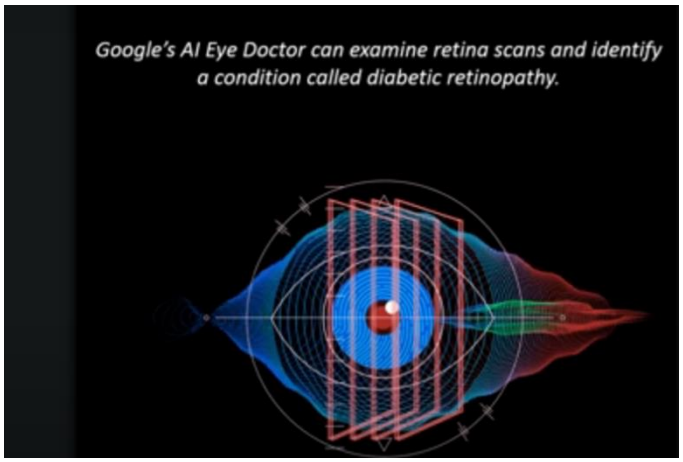
More than 230 health care organizations use IBM AI technology, which is IBM WATSON,

IBM WATSON technology was able to cross reference 20 million oncology records quickly and correctly diagnose a rare leukemia condition in a patient. So, it basically went through 20 million records.

GOOGLE'S EYE DOCTOR -

GOOGLE'S AI EYE DOCTOR can examine retina scans and identify a condition called diabeticretinopathy.

e-ISSN: 2231-5152; p-ISSN: 2249-1796



FACEBOOK

In SOCIAL MEDIA PLATFORM like FACEBOOK, AI is used FOR FACE VERIFICATION wherein you make use of MACHINE LEARNING and DEEP LEARNING concept in order to detect facial features and tag your friends. All the auto tagging feature that you see in FACEBOOK, behind that there is MACHINE LEARNING, DEEP LEARNING, and NEURAL NETWORKS. There is only AI behind it. The entire social media platform like INSTAGRAM, FACEBOOK, TWITTER, they heavily rely on AI.

13. TWITTER's AI which is being used to identify any sort of hate speech and terroristic language in tweets. So agin, it makes use of MACHINE LEARNING, DEEP LEARNING, and NATURAL LANGUAGE PROCESSING in order to filter out any offensive or any reportable content. The company discovered and banned 300,000 terrorist linked accounts, 95% of which were found by non - human, artificially intelligent machines.

VIRTUAL ASSISTANT

14. GOOGLE ASSISTANT - We have virtual assistants like Siri, Alexa. Newly released "The Google Duplex" not only responds to calls and book appointments for you, it also adds a human touch. So it adds human filters and all of that. It makes it sound very realistic. It is actually very hard to distinguish between human and AI speaking over the phone.

TESLA SELF DRIVING CARS -

AI is famous for self driving cars so, AI implements computer vision, image detection, deep learning, in order to build cars that can automatically detect any objects or any obstacles and drive around without human intervention. So these are fully automated self - driving cars.

Tesla Self Driving Cars "robot taxi version" one that can ferry passengers without anyone behind the wheel, drive without any human intervention. A lot of tech giant companies like Google, Tesla, Facebook, all of these data - driven companies. Netflix also makes use of AI.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

15. NETFLIX - With the help of AI and MACHINE LEARNING, Netflix has developed a personalized movie recommendation for each of its users. So if each of you opened up NETFLIX and if you look at the type of movies that are recommended to you, they are different. This is because NETFLIX studies each user's personal details, and tries to understand what each user is interested in and what sort of movie patterns each user has, and then it recommends movies to them. So NETFLIX uses the watching history of other users with similar taste to recommend what you may be most interested in watching next, so that you can stay engaged and continue your monthly subscription. Also, there is a known fact over 75% of what you watch is recommended by Netflix. So their recommendation engine is brilliant. And the logic behind their recommendation engine AI and MACHINE LEARNING

16. SPAM FILTERING - .

If you open up your inbox right now, you will notice that there are separate sections. For Example, we have primary section, social section, and all of that. Gmail has a separate section called the spam mails also. So, what Gmail does is it makes use of concepts of AI and MACHINE LEARNING algorithms to classify emails as spam and non - spam. Many times certain words or phrases are frequently used in spam emails. If you notice your spam emails, they have words like lottery, earn, and full refund. All of this denotes that the email is more likely to be a spam one. So such words and correlations are understood by using MACHINE LEARNING AND NATURAL LANGUAGE PROCESSING and a few other aspects of AI

17. BIOMETRIC ATTENDANCE where you trained the machine and after couple of inputs of your biometric identity beat your thumb your iris or yellow or anything once trained machine gun validate your future input

IN A SENSE, ARTIFICIAL INTELLIGENCE IS A TECHNIQUE OF GETTING MACHINES TO WORK AND BEHAVE LIKE HUMANS. IN THE REST PAST, ARTIFICIAL INTELLIGENCE HAS BEEN ABLE TO ACCOMPLISH THIS BY CREATING MACHINES AND ROBOTS THAT HAVE BEEN USED IN WIDE RANGE OF FIELDS, INCLUDING HEALTH CARE, ROBOTICS, MARKETING, BUSINESS ANALYTICS, AND MANY MORE.

AI IS DIVIDED INTO THREE DIFFERENT EVOLUTIONARY STAGES. FIRST WE HAVE

1 - ARTIFICIAL NARROW INTELLIGENCE FOLLOWED BY

2 - ARTIFICIAL GENERAL INTELLIGENCE FOLLOWED BY

3 - ARTIFICIAL SUPER INTELLIGENCE

e-ISSN: 2231-5152; p-ISSN: 2249-1796

1 - ARTIFICIAL NARROW INTELLIGENCE - ARTIFICIAL NARROW INTELLIGENCE WHICH IS ALSO KNOWN AS WEAK AI IT INVOLVES APPLYING AI THAT CLAIM TO USE AI ARE ACTUALLY OPERATING AS WEAK ARTIFICIAL |INTELLIGENCE FOCUSED ON A NARROWLY DEFINED SPECIFIC PROBLEM ONLY TO SPECIFIC TASKS. ALEXA IS A VERY GOOD EXAMPLE OF WEAK AI. IT OPERATES WITHIN UNLIMITED PRE – DEFINED RANGE OF FUNCTIONS. THERE IS NO GENUINE INTELLIGENCE OR THERE IS NO SELF AWARENESS, DESPITE BEING A SOPHISTICATED EXAMPLE OF WEAK AI. THE GOOGLE SEARCH ENGINE, SOPHIA THE HUMANOID, SELF – DRIVING CARS, AND EVEN THE FAMOUS ALPHAGO FALLS UNDER THE CATEGORY OF WEAK AI, WE ARE NOW AT THE STAGE OF WEAK AI. WE ACTUALLY HAVEN'T REACHED AI GENERAL INTELLIGENCE OR SUPER INTELLIGENCE.

THE GOOGLE SEARCH ENGINE, SOPHIA THE HUMANOID, SELF - DRIVING CARS AND EVEN THE FAMOUS ALPHA FALL UNDER THE CATEGORIES OF WEAK AI.

ARTIFICIAL GENERAL INTELLIGENCE IS ALSO KNOWN AS STRONG AI, IT INVOLVES MACHINES AND POSSESS THE ABILITY TO PERFORM ANY INTELLIGENT TASK THAT HUMAN BEING CAN DO.

Actually, something that a lot of people don't realize that is Machines don't possess human -like abilities. They have a very strong processing unit that can perform high - level computations, but they are not yet capable of doing the simple and the most reasonable things that a human being can. If you tell a machine to process like a million documents, it will probably do that in a matter of 10 seconds, of a minute, or even 10 minutes. But if you ask a machine to walk up to your living room and switch on the TV, a machine will take forever to learn that, because machines don't have the reasonable way of thinking. They have a very strong processing unit, but they are not yet capable of thinking and reasoning like a human being. So that's exactly why we are still stuck on Artificial Narrow Intelligence. So far we have not developed any machine that can fully be called strong AI. Even though there are examples of AlphaGo Zero which defeated AlphaGo in the game of Go. AlphaGo Zero basically learned in a span of four months. It learned on its own without any human intervention. But even then, it was not classified as a fully strong AI, because it cannot reason like a human being.

3 - SUPER INTELLIGENCE - ARTIFICIAL SUPER INTELLIGENCE IS A TERM REFERRING TO THE TIME WHEN THE CAPABILITIES OF A COMPUTER WILL SURPASS THAT OF A HUMAN BEING. IN ALL ACTUALLY, IT WILL TAKE A WHILE FOR US TO ACHIEVE ARTIFICIAL SUPER INTELLIGENCE. PRESENTLY, IT'S SEEN AS A HYPOTHETICAL SITUATION AS DEPICTED IN MOVIES AND ANY SCIENCE FICTION BOOKS WHEREIN MACHINES HAVE TAKEN OVER THE WORLD, MOVIES LIKE TERMINATOR AND ALL OF THAT DEPICT AI. THESE DON'T EXIST YET, WHICH WE SHOULD BE THANKFUL FOR, BUT THERE ARE A LOT OF PEOPLE WHO SPECULATE THAT ARTIFICIAL SUPER INTELLIGENCE WILL TAKE OVER THE WORLD BY THE YEAR 2040.

To summarize the types of AI, we have only weak ARTIFICIAL INTELLIGENCE. All the major AI technologies that you see are artificial narrow intelligence. We don't have any machines which are capable of thinking like a human being.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

LX. MOST EFFECTIVE LANGUAGE FOR AI IS PYTHON

- PYTHON IS AN INTERPRETED, OBJECT – ORIENTED, PROCEDURE ORIENTED HIGH LEVEL PROGRAMMING LANGUAGE WITH DYNAMIC SEMANTICS.
- IT CAN BE VERY EASILY IMPLEMENTED. IT IS A HIGH-LEVEL LANGUAGE; ONE DOES NOT NEED TO BOTHER ABOUT LIKE MEMORY ALLOCATION. IT IS PORTABLE, MEANING THAT YOU CAN USE IT ON ANY PLATFORM WHILE WRITING PYTHON SCRIPT. PYTHON SUPPORTED BY MANY PLATFORMS LIKE LINUX, WINDOWS, FREEBSD, MACINTOSH, SOLARIS, OS/2, AMIGA, AROS, AS/400, BEOS, OS/390, PLAYSTATION, ETC. IT SUPPORT DIFFERENT PROGRAMMING PARADIGMS LIKE OBJECT – ORIENTED AND PROCEDURE ORIENTED PROGRAMMING, AND IT IS EXTENSIBLE, MEANING THAT IT CAN INVOKE C AND C++ LIBRARIES. THE LANGUAGE IS USED TO DEVELOP DATA SCIENCE ALGORITHMS, MACHINE LEARNING ALGORITHMS, AND IOT PROJECTS.

Python can invoke C and C++ programs can integrate with Java and .net components

PYTHON FOR ARTIFICIAL INTELLIGENCE

Python is a general-purpose language - wide range of application for

1. **Web Development**
2. **Mathematical computations**
3. **Graphical user interface**

For example - PiBrian is use for MACHINE LEARNING
NumPy which can be used for scientific computation, Pandas and so on. There is N number of libraries in Python.

Lot of developer prefer to use Python and a lot of Data Scientists are also comfortable with Python Language. This is partly because the syntaxes which belong to Python are very simple and easy to learn. Many AI algorithm and MACHINE LEARNING algorithm easily implement by Python because there are lot of libraries which are predefined function for these algorithms. So have to do is you have to call that function. You don't actually have to call your algorithm. It is considered the best choice for AI.

With Python Stand 'R' which is a statistical programming language. 'R' is one of the most effective language and environment for analyzing and manipulates the data for statistical purpose. It is a statistical programming language. So using 'R' we can easily produced well designed publication quality plots, including mathematical symbol and formula, wherever needed. 'R' is also one of the easiest languages. **The syntax is very similar to English Language** and it also has N number of libraries that supports statistical Data Science, AI, MACHINE LEARNING, and so on. It also has pre - defined functions, MACHINE LEARNING algorithm, and natural language processing and so on. Apart from this we have Java for AI developer.

JAVA (OOPS) - Java considered as a good choice of AI development.

Ai with lot of do with search algorithm, artificial neural networks, and genetic programming and Java provides many benefits. It is easy to use. Debugging is very easy, package services. There are simplified work will large scale projects. There is a good user interaction, and graphical representation of data. It has something known as the standard widget toolkit, which can be used for making graphs and interfaces so, graphic virtualization is actually a very important part of AI or data science, or MACHINE LEARNING for matter.

MACHINE LEARNING

MACHINE LEARNING is used in AI. MACHINE LEARNING is a method through which you can feed lot of data to a machine and make it learn.

In simple terms - MACHINE LEARNING is a subset of AI which provides machines the ability to learn automatically and improve from experience without being explicitly programmed.

It focuses mainly AI on the designing of systems; thereby allowing them to learn and make predictions based on some experiments which data in case of machines.

ARTIFICIAL INTELLIGENCE is a vast of field. Under AI we have MACHINE LEARNING, we have NLP, we have expert systems, and we have image recognition, object detection and so on. So, AI is sort of a process or it is a methodology in which you make machines, mimic the behavior of human beings. MACHINE LEARNING is a way in which you feed a lot of data to a machine, so that it can make depth decision. Let's get into depth about MACHINE LEARNING.

NEED OF MACHINE LEARNING

Since technology became the center of everything, we have been generating an immeasurable amount of data. As per research, we generate around 2.5 quintillion bytes of data every single data and it is estimated that by this year, 2020, 1.7 mb of data will be created every second for every person on earth. If you watching video on YouTube also accounts for data generation so, there is data everywhere. So with the availability of so much data, it is finally possible to build predictive models that can study and analyze complex data to find useful insights and deliver more accurate results. So, top tier companies like Netflix and Amazon build such machine learning models by using tons of data in order to identify any profitable opportunity and avoid any unwanted risk.

The most important thing for ARTIFICIAL INTELLIGENCE is data.

For ARTIFICIAL INTELLIGENCE or whether it is machine learning or deep learning, it is always data.

Now we have lot of data we can find a way to analyze, process, and draw useful insights from this data in order to help us grow businesses or to find solutions to some problems. Data is the solution. We just need to know how to handle the data. And the way to handle data is through machine learning, deep learning, and AI.

International Journal of Advances in Engineering Research

e-ISSN: 2231-5152; p-ISSN: 2249-1796

LXI. PHYSICAL LAWS

They are propositions, that is, they are the sorts of things that bear truth-values. There is no such thing as a false physical law. In saying that physical laws are the sorts of things that are true or false, I mean that they form a subset of those things that are true or false or, more specifically, of those things that are true.
"Physical law" is a success term: If something we have taken (assumed, believed, etc.) to be a law is subsequently learned to be false, that proposition is not a false law, but no law at all. In this regard, that is, in implying the truth of its subject, "is a physical law" belongs to a class of predicates including such others as "is known" and "is logically necessary."

FOR EXAMPLE -

THIS EMAIL IS CRYPTOGRAPHICALLY DESIGNED WITH THE HIDDEN MEANING OF CHAPTER 1 OF BHAGAVAD GITA.

We can read this e -mail with deep learning concept of artificial intelligence.

CONFLICT: ARJUN DESPAIR

Ekta Singh <**singhsisterslegalservices@gmail.com**> 4, 2:44 PM

to Sujit.Bakshi, Anand.Mahindra, kalyan.krishnamurthy, RMGBPSBT, NoidaFlipkartHR, Hina.bisht

Team,

Here, you have an opportunity to prove me wrong and if you have absolute guts prove that I am mentally sick.

FEEDBACK FOR HINA BISHT

We should know how to handle the conflicts in the team particularly if you are in the management environment. I was expecting you to understand how to manage the conflicts in the team because any task you do you have to come across problems. The trainer should become the captain to imagine the problems and defeat the conflicts and succeed but you are failed. You must understand CONFLICT MANAGEMENT.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

WHY I ASKED YOU ABOUT CREATIVITY?

Learning gives creativity, creativity leads to thinking, thinking provides knowledge, knowledge makes you great. History has proven that those who dared to imagine the impossible! Are the one who break all the human limitations?

In every field of human endeavor whether science, medicine, sports, arts and technology the names are the people who imagined the impossible are engraved in our history by breaking the limits of their imaginations they changed the world you can motivate trainees by the example of CV Raman, you take Newton, you take Einstein, you take Chandrasekhar by breaking the limits of their imaginations they can change the world. If you want the best leaders, you must do experiments, test and illuminate creative minds that have been constantly working and imagine the outcome. All the forces of the universe work for that inspire the mind thereby leading to invention & discoveries.

Maybe you have many accomplishments, you are a trainer, trainer is like a teacher must be the radiation of knowledge, radiation of PURITY of life.

Reason being, the way of teaching can shape the dream of others, vision of life. Time is currency. When you are good trainer, you have opportunity to grow minds to give the dreams to young people and mature the dream with them and they will become great human being, sometimes they will become better than you better than the trainer.

GENTLENESS:

As per your chat tone

You are capable of being violent but you must choose to be gentle -that is of great value.

Below mentioned Learning and Development training can be helpful for you

1. **Conflict Management**
2. **Soft Skills**
3. **Lean Six Sigma**

The Training module must be more advanced as per today's time, you must include coding, artificial intelligence, motivation phrases, leadership skills.

FEEDBACK FOR SHILPA

Darling,

I am so much capable of changing OOPS moments into WOW moments. Once you scolded me in late night hours and said to myself "HONEYMOON and SHER SHAYARI". Your so-called trainer is saying

that I need Mr. SOMEONE. So, here is an opportunity for you people. Why don't you search for a man who is 90% positive?

Another thing why do you feel ashamed when I asked about feedback form? When life is transforming, why are you thinking training modules should not be transformed.

You were the person who conducted day 1 training. I want to draw your attention that the entire training depends on "COMMUNICATION" the only word, you can not cover the subject in only 3 seconds.

You are not supposed to be there to manufacture the labors in the company. Be a leader and think like a leader.

Just as one spice does not create a dish, and just as a good curry is a clever combination of various spices, even a good trainer is a combination of various qualities.

I hope you will understand my points of creativity.

Thanks.

Ekta Singh

We can relate conflict of trainee and trainer with the conflict between dharma and adharma and we can understand deep meaning in relation with "BHAGAVAD GITA"

THE CONFLICT BETWEEN DHARMA AND ADHARMA IS A POINT RAISED BY ARJUNA IN Chapter 1, Verse 7

O best of the brahmanas, for your information, let me tell you about the captains who are especially qualified to lead my military force.

Empathy is not about controlling others through rules. This is why Krishna continuously distinguishes between sva – dharma and para – dharma, appropriate conduct of the self and the other.

A world created based on judgment evokes rage. Life becomes a battleground like Kuru-kshetra, where both sides feel like victims, where everyone wants to win at all costs, where someone will always lose. A world created by observation evokes insight, hence affection, for we see the hunger and fear of all beings. Life becomes a performance on a stage (ranga – bhoomi) aimed to nourish and comfort the other, while deriving nourishment and comfort from their delight. Krishna's performance leads to him being worshipped as Ranga – natha, lord of the stage. He never judges, so he sees no one as victim. This is how he begins the Gita.

Bhagavad Gita: Chapter 2, Verse 11 (Paraphrased)

Arjuna, you grieve for those whom you should not feel sorry for, and you argue as if you are a man of wisdom. But the wise grieve for no one: neither the living, nor the dead.

Do you see me as hero, villain or victim? If yes, then you are not doing darshan. If you can empathize with the fears that make people heroes, villains and victims, then you are doing darshan. For then you look beyond the boundaries that separate you from the rest.

In the Gita Lord Krishna simply explains the architecture of the world. As long as we judge, we cannot see the world for what it is; we are simply spellbound by the boundaries that we build separating those whom we consider family from those whom we consider enemy, as we realize in Chapter – 1 of Bhagavad Gita.

The Gita begins with how Dhritarashtra, Duryodhana, and Arjuna view the same battlefield.

In Bhagavad Gita: Chapter 1, verse 37 to 45 (paraphrased)

Arjuna asked to Lord Krishna,

Dhritarashtra's sons are family. How can we slaughter them; they whose greed blinds them to the horror of the situation? If we kill family over property, why will women bother with fidelity, why will communities respect boundaries? All rituals will be abandoned and all ancestors will be forgotten. Those who unravel the fabric of family will surely sink into hell.

This response, full of fear and confusion, is very different from the views of Dhritrashtra and Duryodhana. The Kaurava father and son have clearly drawn boundaries dividing those they consider their own and those they consider as outsiders, intruders, even enemies. Arjuna's boundaries, however, wobble: how can family be enemy?

The Mahabharata describes Arjuna as a highly focussed archer, who could shoot his arrow into the eye of a flying bird without being distracted by the clouds above, or the trees below. Yet, at Kuru – kshetra, Arjuna looks beyond the target and 'sees' family and friends. He questions the morality of his wanting to kill them, and the consequences of such violence on society as a whole. It is not the violence that bothers him; he has killed before. What bothers him is violence against family, those he is meant to protect.

LXII. MACHINE LEARNING

It is so important is, number one, due to increase in data generation. So due to excessive production of data, we need to find a method that can be used to structure, analyze, and draw useful insights from data, this is where MACHINE LEARNING comes in. It is used to solve problems and find solutions through the most complex task faced by organizations. Apart from this, we also needed to improve decision making. So by making use of various algorithms, we are solving millennium problem.

MACHINE LEARNING can be used to make better business decisions. For example, MACHINE LEARNING is used to focus sales. It is used to predict any downfalls in the stock market or identify any sort of risk and anomalies.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Other reasons include that MACHINE LEARNING helps us uncover patterns and trends in data, so finding hidden pattern and extracting key insights for data is the most important part of MACHINE LEARNING. So by building predictive models and using statistical techniques MACHINE LEARNING allows you to dig beneath the surface and explode the data at a minute seal. Understanding data and extracting patterns manually takes a lot time. It will take several days for us to extract any useful information from data. But if you use machine learning algorithms, you can perform similar computations in less than a second. Another reason is we need to solve complex problems. So from detecting the genes linked to the deadly so from detection the genes linked to the deadly ALS disease, to building self - driving cars, MACHINE LEARNING can be used to solve the most complex problems.

At present, we also found a way to spot stars which are 2,400 light years away from our planet. All of this is possible through AI, ML, DL, and these techniques.

With the availability of so much data, it is finally possible to build predictive models that can study and analyze complex data to find useful insights and deliver more accurate results. So top tier companies like Flip kart, Netflix and Amazon build such MACHINE LEARNING models by using tons of data in order to identify any profitable opportunity and avoid any unwanted risk. Most important thing for Ai is data for Ai or whether it's MACHINE LEARNING or deep learning, it's always data. And, now, that we have a lot of data. We can find a way to analyze, process, and draw useful insights from this data in order to help us grow business or to find solutions to some problems. Data is the solution. We just need to know how to handle the data. And the way to handle data is through MACHINE LEARNING, deep learning, and Ai. Few reasons why MACHINE LEARNING is so important is, number one, due to increase in data generation. So due to excessive production of data, we need to find a method that can be used to structure, analyze, and draw useful insights from data this is where MACHINE LEARNING comes in. It is used to solve problem and final solution through the most complex task faced by organization. Apart from this, we also needed to improve decision making so by making use of various algorithms. MACHINE LEARNING can be used to make better business decisions. For example MACHINE LEARNING is used to focus sales. It is used to predict any downfalls and the stock market or identify any sort of risk and anomalies.

LXIII. COMPUTING WITH LANGUAGE: TEXTS AND WORDS

We're all very familiar with text, since we read and write it every day. Here we will treat text as *raw data* for the programs we write, programs that manipulate and analyze it in a variety of interesting ways. But before we can do this, we have to get started with the Python interpreter.

One of the friendly things about Python is that it allows you to type directly into the interactive interpreter the program that will be running your Python programs. You can access the Python interpreter using a simple graphical interface called the Interactive Development Environment (IDLE).

Python 2.5.1 (r251:54863, Apr 15 2008, 22:57:26)

[GCC 4.0.1 (Apple Inc. build 5465)] on darwin

Type "help", "copyright", "credits" or "license" for more information.

>>>

The >>> prompt indicates that the Python interpreter is now waiting for input.

Python as a calculator:

>>> 1 + 5 * 2 - 3

8

>>>

Once the interpreter has finished calculating the answer and displaying it, the prompt reappears. This means the Python interpreter is waiting for another instruction.

Let’s begin by finding out the length of a text from start to finish, in terms of the words

and punctuation symbols that appear. We use the term len to get the length of something,

which we’ll apply here to the book of Genesis:

>>> len(text3)

44764

>>>

So Genesis has 44,764 words and punctuation symbols, or “tokens.” A **token** is the technical name for a sequence of characters—such as hairy, his, or :)—that we want to treat as a group. When we count the number of tokens in a text, say, the phrase to be or not to be, we are counting occurrences of these sequences. Thus, in our example phrase there are two occurrences of to, two of be, and one each of or and not. But there are only four distinct vocabulary items in this phrase. How many distinct words does the book of Genesis contain? To work this out in Python, we have to pose the question slightly differently. The vocabulary of a text is just the set of tokens that it uses, since

in a set, all duplicates are collapsed together. In Python we can obtain the vocabulary

e-ISSN: 2231-5152; p-ISSN: 2249-1796

COUNTING VOCABULARY

The most obvious fact about texts that emerges from the preceding examples is that they differ in the vocabulary they use.

Let's begin by finding out the length of a text from start to finish, in terms of the words and punctuation symbols that appear. We use the term len to get the length of something, which we'll apply here to the book of Genesis:

```
>>> len(text3)
44764
>>>
```

So Genesis has 44,764 words and punctuation symbols, or "tokens." A **token** is the technical name for a sequence of characters—such as hairy, his, or :)—that we want to treat as a group. When we count the number of tokens in a text, say, the phrase to be or not to be, we are counting occurrences of these sequences. Thus, in our example phrase there are two occurrences of to, two of be, and one each of or and not. But there

are only four distinct vocabulary items in this phrase. How many distinct words does the book of Genesis contain? To work this out in Python, we have to pose the question slightly differently. The vocabulary of a text is just the set of tokens that it uses, since in a set, all duplicates are collapsed together. In Python we can obtain the vocabulary

Let's begin by finding out the length of a text from start to finish, in terms of the words and punctuation symbols that appear. We use the term len to get the length of something, which we'll apply here to the book of Genesis:

```
>>> len(text3)
44764
>>>
```

items of text3 with the command: set(text3). When you do this, many screens of

words will fly past. Now try the following:

```
>>> sorted(set(text3))
['!', '"', '(', ')', ',', ',)', '.', '.)', ':', ';', ';)', '?', '?)',
'A', 'Abel', 'Abelmizraim', 'Abidah', 'Abide', 'Abimael', 'Abimelech',
'Abr', 'Abrah', 'Abraham', 'Abram', 'Accad', 'Achbor', 'Adah', ...]
>>> len(set(text3))
```

2789

>>>

By wrapping sorted() around the Python expression set(text3) , we obtain a sorted list of vocabulary items, beginning with various punctuation symbols and continuing with words starting with A. All capitalized words precede lowercase words. We discover the size of the vocabulary indirectly, by asking for the number of items in the set, and again we can use len to obtain this number . Although it has 44,764 tokens

A **word type** is the form or spelling of the word independently of its specific occurrences in a text—that is, the word considered as a unique item of vocabulary. Our count of 2,789 items will include punctuation symbols, so we will generally call these unique items **types** instead of word types.

Now, let's calculate a measure of the lexical richness of the text. The next example shows us that each word is used 16 times on average (we need to make sure Python uses floating-point division):

>>> from __future__ import division

>>> len(text3) / len(set(text3))

16.050197203298673

>>>

Next, let's focus on particular words. We can count how often a word occurs in a text,

and compute what percentage of the text is taken up by a specific word:

>>> text3.count("smote")

5

>>> 100 * text4.count('a') / len(text4)

1.4643016433938312

>>>

You may want to repeat such calculations on several texts, but it is tedious to keep retyping the formula. Instead, you can come up with your own name for a task, like "lexical_diversity" or "percentage", and associate it with a block of code. Now you only have to type a short name instead of one or more complete lines of Python code, and you can reuse it as often as you like. The block of code that does a task for us is called a **function**, and we define a short name for our function with the keyword def.

The next example shows how to define two new functions, lexical_diversity() and

percentage():

```
>>> def lexical_diversity(text):
... return len(text) / len(set(text))
...
>>> def percentage(count, total):
...RETURN 100 * COUNT / TOTAL
```

In the definition of lexical diversity() , we specify a **parameter** labeled text. This parameter is a "placeholder" for the actual text whose lexical diversity we want to compute, and reoccurs in the block of code that will run when the function is used, in line . Similarly, percentage() is defined to take two parameters, labeled count and total . Once Python knows that lexical_diversity() and percentage() are the names for specific blocks of code, we can go ahead and use these functions:

```
>>> lexical_diversity(text3)
16.050197203298673
>>> lexical_diversity(text5)
7.4200461589185629
>>> percentage(4, 5)
80.0
>>> percentage(text4.count('a'), len(text4))
1.4643016433938312
>>>
```

To recap, we use or **call** a function such as lexical_diversity() by typing its name, followed by an open parenthesis, the name of the text, and then a close parenthesis. These parentheses will show up often; their role is to separate the name of a task—such as lexical_diversity()—from the data that the task is to be performed on—such as text3. The data value that we place in the parentheses when we call a function is an **argument** to the function.

LISTS

What is a text? At one level, it is a sequence of symbols on a page such as this one. At another level, it is a sequence of chapters, made up of a sequence of sections, where each section is a sequence of paragraphs, and so on. However, for our purposes, we will think of a text as nothing more than a sequence of words and punctuation. Here's how we represent text in Python, in this case the opening sentence of Moby Dick:

>>> sent1 = ['Call', 'me', 'Ishmael', '.']

>>>

After the prompt we've given a name we made up, sent1, followed by the equals sign, and then some quoted words, separated with commas, and surrounded with brackets. This bracketed material is known as a **list** in Python: it is how we store a text. We can inspect it by typing the name . We can ask for its length . We can even apply our own lexical_diversity() function to it .

>>> sent1

['Call', 'me', 'Ishmael', '.']

>>> len(sent1)

4

>>> lexical_diversity(sent1)

1.0

>>>

Some more lists have been defined for you, one for the opening sentence of each of our texts, sent2 … sent9. We inspect two of them here; you can see the rest for yourself using the Python interpreter >>> sent2

['The', 'family', 'of', 'Dashwood', 'had', 'long', 'been', 'settled', 'in', 'Sussex', '.']

>>> sent3

['In', 'the', 'beginning', 'God', 'created', 'the', 'heaven', 'and', 'the', 'earth', '.']

>>>

Make up a few sentences of your own, by typing a name, equals sign, and a list of words, like this: ex1 = ['Monty', 'Python', 'and', 'the', 'Holy', 'Grail']. Repeat some of the other Python operations we saw earlier

e.g., sorted(ex1), len(set(ex1)),

ex1.count('the').

A pleasant surprise is that we can use Python's addition operator on lists. Adding two lists creates a new list with everything from the first list, followed by everything from the second list:

e-ISSN: 2231-5152; p-ISSN: 2249-1796

```
>>> ['Monty', 'Python'] + ['and', 'the', 'Holy', 'Grail']

['Monty', 'Python', 'and', 'the', 'Holy', 'Grail']
```

This special use of the addition operation is called **concatenation**; it combines the lists together into a single list. We can concatenate sentences to build up a text.

We don't have to literally type the lists either; we can use short names that refer to predefined lists.

```
>>> sent4 + sent1

['Fellow', '-', 'Citizens', 'of', 'the', 'Senate', 'and', 'of', 'the', 'House', 'of', 'Representatives', ':', 'Call', 'me', 'Ishmael', '.']

>>>
```

What if we want to add a single item to a list? This is known as **appending**. When we append() to a list, the list itself is updated as a result of the operation.

```
>>> sent1.append("Some")

>>> sent1

['Call', 'me', 'Ishmael', '.', 'Some']

>>>
```

INDEXING LISTS

As we have seen, a text in Python is a list of words, represented using a combination of brackets and quotes. Just as with an ordinary page of text, we can count up the total number of words in text1 with len(text1), and count the occurrences in a text of a particular word—say, heaven—using text1.count('heaven').

With some patience, we can pick out the 1st, 173rd, or even 14,278th word in a printed text. Analogously, we can identify the elements of a Python list by their order of occurrence in the list. The number that represents this position is the item's **index**. We instruct Python to show us the item that occurs at an index such as 173 in a text by writing the name of the text followed by the index inside square brackets:

```
>>> text4[173]

'awaken'

>>>
```

We can do the converse; given a word, find the index of when it first occurs:

```
>>> text4.index('awaken')
```

173

>>>

Indexes are a common way to access the words of a text, or, more generally, the elements of any list. Python permits us to access sublists as well, extracting manageable pieces of language from large texts, a technique known as **slicing**.

>>> text5[16715:16735]

['U86', 'thats', 'why', 'something', 'like', 'gamefly', 'is', 'so', 'good', 'because', 'you', 'can', 'actually', 'play', 'a', 'full', 'game', 'without', 'buying', 'it']

>>> text6[1600:1625]

['We', "'", 're', 'an', 'anarcho', '-', 'syndicalist', 'commune', '.', 'We', 'take', 'it', 'in', 'turns', 'to', 'act', 'as', 'a', 'sort', 'of', 'executive', 'officer', 'for', 'the', 'week']

>>>

Indexes have some subtleties, and we'll explore these with the help of an artificial sentence:

>>> sent = ['word1', 'word2', 'word3', 'word4', 'word5',

... 'word6', 'word7', 'word8', 'word9', 'word10']

>>> sent[0]

'word1'

>>> sent[9]

'word10'

>>>

Notice that our indexes start from zero: sent element zero, written sent[0], is the first word, 'word1', whereas sent element 9 is 'word10'. The reason is simple: the moment Python accesses the content of a list from the computer's memory, it is already at the first element; we have to tell it how many elements forward to go. Thus, zero steps forward leaves it at the first element.

Now, if we accidentally use an index that is too large, we get an error:

>>> sent[10]

Traceback (most recent call last):

File "<stdin>", line 1, in ?

IndexError: list index out of range

>>>

This time it is not a syntax error, because the program fragment is syntactically correct.

Instead, it is a **runtime error**, and it produces a Traceback message that shows the context of the error, followed by the name of the error, IndexError, and a brief explanation.

Let’s take a closer look at slicing, using our artificial sentence again. Here we verify that the slice 5:8 includes sent elements at indexes 5, 6, and 7:

>>> sent[5:8]

['word6', 'word7', 'word8']

>>> sent[5]

'word6'

>>> sent[6]

'word7'

>>> sent[7]

'word8'

>>>

By convention, m:n means elements m…n-1. As the next example shows, we can omit the first number if the slice begins at the start of the list , and we can omit the second number if the slice goes to the end :

>>> sent[:3]

['word1', 'word2', 'word3']

>>> text2[141525:]

['among', 'the', 'merits', 'and', 'the', 'happiness', 'of', 'Elinor', 'and', 'Marianne',

',', 'let', 'it', 'not', 'be', 'ranked', 'as', 'the', 'least', 'considerable', ',',

'that', 'though', 'sisters', ',', 'and', 'living', 'almost', 'within', 'sight', 'of',

'each', 'other', ',', 'they', 'could', 'live', 'without', 'disagreement', 'between',

'themselves', ',', 'or', 'producing', 'coolness', 'between', 'their', 'husbands', '.',

'THE', 'END']

>>>

e-ISSN: 2231-5152; p-ISSN: 2249-1796

We can modify an element of a list by assigning to one of its index values. In the next example, we put sent[0] on the left of the equals sign . We can also replace an entire slice with new material . A consequence of this last change is that the list only has four elements, and accessing a later value generates an error .

```
>>> sent[0] = 'First'
>>> sent[9] = 'Last'
>>> len(sent)
10
>>> sent[1:9] = ['Second', 'Third']
>>> sent
['First', 'Second', 'Third', 'Last']
>>> sent[9]
Traceback (most recent call last):
File "<stdin>", line 1, in ?
IndexError: list index out of range
>>>
```

VARIABLES

We have had access to texts called text1, text2, and so on. It saved a lot of typing to be able to refer to a 250,000-word book with a short name like this! In general, we can make up names for anything we care to calculate. We did this ourselves in the previous sections, e.g., defining a **variable** sent1, as follows:

```
>>> sent1 = ['Call', 'me', 'Ishmael', '.']
>>>
```

Such lines have the form: variable = expression. Python will evaluate the expression, and save its result to the variable. This process is called **assignment**. It does not generate any output; you have to type the variable on a line of its own to inspect its contents. The equals sign is slightly misleading, since information is moving from the right side to the left. It might help to think of it as a left-arrow. The name of the variable can be anything you like, e.g., my_sent, sentence, xyzzy. It must start with a letter, and can include numbers and underscores. Here are some examples of variables and assignments:

```
>>> my_sent = ['Bravely', 'bold', 'Sir', 'Robin', ',', 'rode',
```

e-ISSN: 2231-5152; p-ISSN: 2249-1796

... 'forth', 'from', 'Camelot', '.']

>>> noun_phrase = my_sent[1:4]

>>> noun_phrase

['bold', 'Sir', 'Robin']

>>> wOrDs = sorted(noun_phrase)

>>> wOrDs

['Robin', 'Sir', 'bold']

>>>

Remember that capitalized words appear before lowercase words in sorted lists.

Notice in the previous example that we split the definition of my_sent over two lines. Python expressions can be split across multiple lines, so long as this happens within any kind of brackets. Python uses the ... prompt to indicate that more input is expected. It doesn't matter how

much indentation is used in these continuation lines, but some indentation usually makes them easier to read. It is good to choose meaningful variable names to remind you—and to help anyone else who reads your Python code—what your code is meant to do. Python does not try to make sense of the names; it blindly follows your instructions, and does not object if you do something confusing, such as one = 'two' or two = 3. The only restriction is that a variable name cannot be any of Python's reserved words, such as def, if, not, and import. If you use a reserved word, Python will produce a syntax error:

>>> not = 'Camelot'

File "<stdin>", line 1

not = 'Camelot'

^

SyntaxError: invalid syntax

>>>

We will often use variables to hold intermediate steps of a computation, especially when this makes the code easier to follow. Thus len(set(text1)) could also be written:

>>> vocab = set(text1)

>>> vocab_size = len(vocab)

>>> vocab_size

19317

>>>

STRINGS

Some of the methods we used to access the elements of a list also work with individual words, or **strings**. For example, we can assign a string to a variable , index a string , and slice a string .>>> name = 'Monty'

>>> name[0]

'M'

>>> name[:4]

'Mont'

>>>

We can also perform multiplication and addition with strings:

>>> name * 2

'MontyMonty'

>>> name + '!'

'Monty!'

>>>

We can join the words of a list to make a single string, or split a string into a list, as

follows:

>>> ' '.join(['Monty', 'Python'])

'Monty Python'

>>> 'Monty Python'.split()

['Monty', 'Python']

>>>

We have two important building blocks—lists and strings—and are ready to get back to some language analysis.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

LXIV. COMPUTING WITH LANGUAGE: SIMPLE STATISTICS

Let's return to our exploration of the ways we can bring our computational resources to bear on large quantities of text. We saw how to search for words in context, how to compile the vocabulary of a text, how to generate random text in the same style, and so on. In this section, we pick up the question of what makes a text distinct, and use automatic methods to find characteristic words and expressions of a text. We can try new features of the Python language by copying them into the interpreter, and you'll learn about these features systematically in the following section. Before continuing further, you might like to check your understanding of the last section by predicting the output of the following code. You can use the interpreter to check whether you got it right. If you're not sure how to do this task, it would be a good idea to review the previous section before continuing further.

>>> saying = ['After', 'all', 'is', 'said', 'and', 'done',

... 'more', 'is', 'said', 'than', 'done']

>>> tokens = set(saying)

>>> tokens = sorted(tokens)

>>> tokens[-2:]

what output do you expect here?

>>>

LXV. FREQUENCY DISTRIBUTIONS

How can we automatically identify the words of a text that are most informative about the topic and genre of the text? Imagine how you might go about finding the 50 most frequent words of a book. One method would be to keep a tally for each vocabulary item, like that shown in Figure 1-3. The tally would need thousands of rows, and it would be an exceedingly laborious process—so laborious that we would rather assign the task to a machine.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

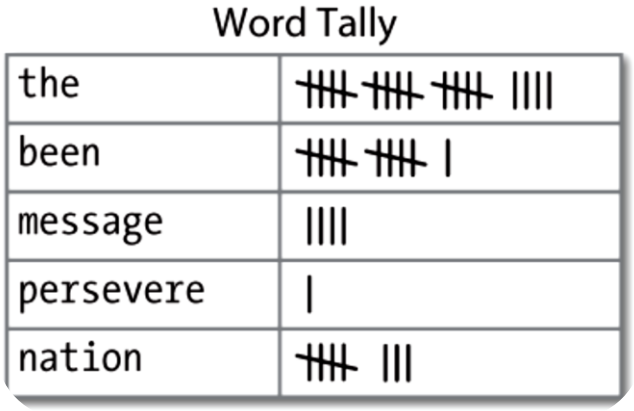


Figure 1-3. Counting words appearing in a text (a frequency distribution).

The table in Figure 1-3 is known as a **frequency distribution** , and it tells us the frequency of each vocabulary item in the text. (In general, it could count any kind of observable event.) It is a “distribution” since it tells us how the total number of word tokens in the text are distributed across the vocabulary items. Since we often need frequency distributions in language processing, NLTK provides built-in support for them. Let’s use a FreqDist to find the 50 most frequent words of Moby Dick. Try to work out what is going on here, then read the explanation that follows.

```
>>> fdist1 = FreqDist(text1)

>>> fdist1

<FreqDist with 260819 outcomes>

>>> vocabulary1 = fdist1.keys()

>>> vocabulary1[:50]

[',', 'the', '.', 'of', 'and', 'a', 'to', ';', 'in', 'that', '"', '-',

'his', 'it', 'I', 's', 'is', 'he', 'with', 'was', 'as', '"', 'all', 'for',

'this', '!', 'at', 'by', 'but', 'not', '--', 'him', 'from', 'be', 'on',

'so', 'whale', 'one', 'you', 'had', 'have', 'there', 'But', 'or', 'were',

'now', 'which', '?', 'me', 'like']

>>> fdist1['whale']

906

>>>
```

e-ISSN: 2231-5152; p-ISSN: 2249-1796

When we first invoke FreqDist, we pass the name of the text as an argument . We can inspect the total number of words ("outcomes") that have been counted up — 260,819 in the case of Moby Dick. The expression keys() gives us a list of all the distinct types in the text , and we can look at the first 50 of these by slicing the list .

Try the preceding frequency distribution example for yourself, for text2. Be careful to use the correct parentheses and uppercase letters. If you get an error message NameError: name 'FreqDist' is not defined, you need to start your work with from nltk.book import *.

Do any words produced in the last example help us grasp the topic or genre of this text?

Only one word, whale, is slightly informative! It occurs over 900 times. The rest of the words tell us nothing about the text; they're just English "plumbing." What proportion of the text is taken up with such words? We can generate a cumulative frequency plot for these words, using fdist1.plot(50, cumulative=True), to produce the graph in Figure 1-4. These 50 words account for nearly half the book!

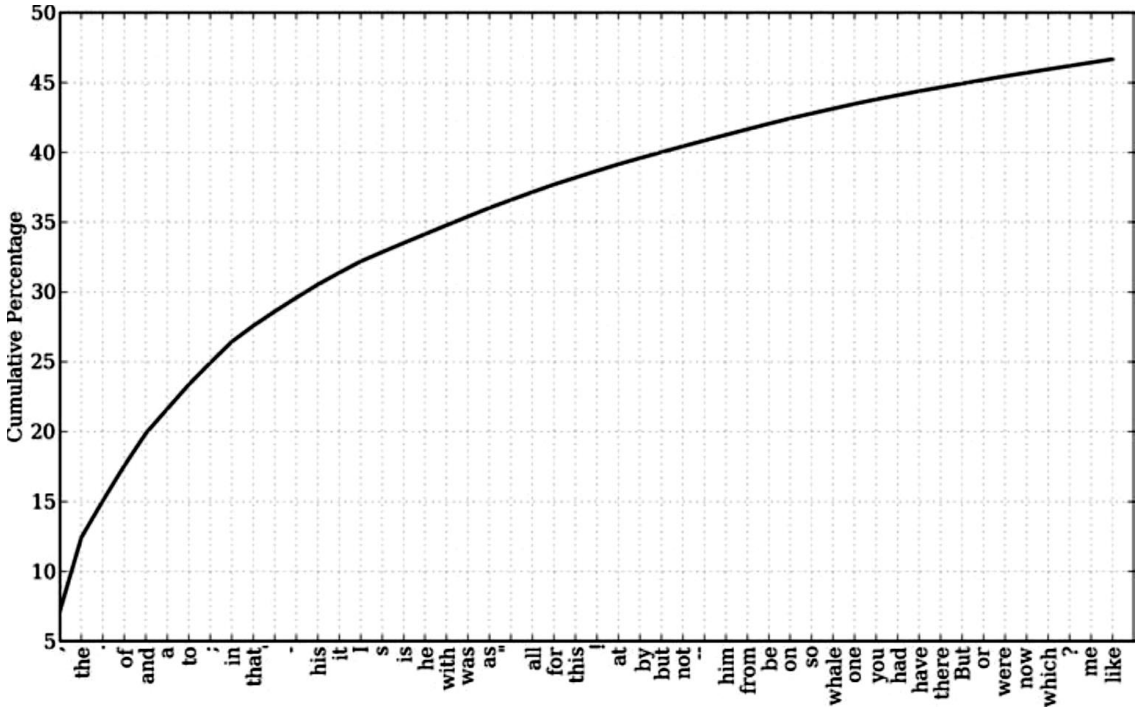


Figure 1-4. Cumulative frequency plot for the 50 most frequently used words in Moby Dick, which account for nearly half of the tokens.

COUNTING OTHER THINGS

Counting words is useful, but we can count other things too. For example, we can look at the distribution of word lengths in a text, by creating a FreqDist out of a long list of numbers, where each number is the length of the corresponding word in the text:

>>> [len(w) for w in text1]

[1, 4, 4, 2, 6, 8, 4, 1, 9, 1, 1, 8, 2, 1, 4, 11, 5, 2, 1, 7, 6, 1, 3, 4, 5, 2, ...]

```
>>> fdist = FreqDist([len(w) for w in text1])
>>> fdist
<FreqDist with 260819 outcomes>
>>> fdist.keys()
[3, 1, 4, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20]
>>>
```

We start by deriving a list of the lengths of words in text1 , and the FreqDist then counts the number of times each of these occurs . The result is a distribution containing a quarter of a million items, each of which is a number corresponding to a word token in the text. But there are only 20 distinct items being counted, the numbers 1 through 20, because there are only 20 different word lengths. I.e., there are words consisting of just 1 character, 2 characters, ..., 20 characters, but none with 21 or more characters. One might wonder how frequent the different lengths of words are (e.g., how many words of length 4 appear in the text, are there more words of length 5 than length 4, etc.). We can do this as follows:

```
>>> fdist.items()
[(3, 50223), (1, 47933), (4, 42345), (2, 38513), (5, 26597), (6, 17111), (7, 14399),
(8, 9966), (9, 6428), (10, 3528), (11, 1873), (12, 1053), (13, 567), (14, 177),
(15, 70), (16, 22), (17, 12), (18, 1), (20, 1)]
>>> fdist.max()
3
>>> fdist[3]
50223
>>> fdist.freq(3)
0.19255882431878046
>>>
```

From this we see that the most frequent word length is 3, and that words of length 3 account for roughly 50,000 (or 20%) of the words making up the book. Although we will not pursue it here, further analysis of word length might help us understand. So far, our little programs have had some interesting qualities: the ability to work with language, and the potential to save human effort through automation. A key feature of programming is the

e-ISSN: 2231-5152; p-ISSN: 2249-1796

ability of machines to make decisions on our behalf, executing instructions when certain conditions are met, or repeatedly looping through text data until some condition is satisfied. This feature is known as **control**, and is the focus of this section.

CONDITIONALS

Python supports a wide range of operators, such as < and >=, for testing the relationship

between values. The full set of these **relational operators** are shown in Table 1-3.

Table 1-3. Numerical comparison operators

Operator Relationship

< Less than

<= Less than or equal to

== Equal to (note this is two “=”signs, not one)

Operator Relationship

!= Not equal to

> Greater than

>= Greater than or equal to

We can use these to select different words from a sentence of news text. Here are some examples—notice only the operator is changed from one line to the next. They all use sent7, the first sentence from text7 (Wall Street Journal). As before, if you get an error saying that sent7 is undefined, you need to first type: from nltk.book import *.

```
>>> sent7
['Pierre', 'Vinken', ',', '61', 'years', 'old', ',', 'will', 'join', 'the',
'board', 'as', 'a', 'nonexecutive', 'director', 'Nov.', '29', '.']
>>> [w for w in sent7 if len(w) < 4]
[',', '61', 'old', ',', 'the', 'as', 'a', '29', '.']
>>> [w for w in sent7 if len(w) <= 4]
[',', '61', 'old', ',', 'will', 'join', 'the', 'as', 'a', 'Nov.', '29', '.']
>>> [w for w in sent7 if len(w) == 4]
```

['will', 'join', 'Nov.']

>>> [w for w in sent7 if len(w) != 4]

['Pierre', 'Vinken', ',', '61', 'years', 'old', ',', 'the', 'board',

'as', 'a', 'nonexecutive', 'director', '29', '.']

>>>

There is a common pattern to all of these examples: [w for w in text if condition], where condition is a Python "test" that yields either true or false. In the cases shown in the previous code example, the condition is always a numerical comparison. However, we can also test various properties of words, using the functions listed in Table 1-4.

Table 1-4. Some word comparison operators

Function Meaning

s.startswith(t) Test if s starts with t

s.endswith(t) Test if s ends with t

t in s Test if t is contained inside s

s.islower() Test if all cased characters in s are lowercase

s.isupper() Test if all cased characters in s are uppercase

s.isalpha() Test if all characters in s are alphabetic

s.isalnum() Test if all characters in s are alphanumeric

s.isdigit() Test if all characters in s are digits

s.istitle() Test if s is titlecased (all words in s have initial capitals)

Here are some examples of these operators being used to select words from our texts: words ending with -ableness; words containing gnt; words having an initial capital; and words consisting entirely of digits.

>>> sorted([w for w in set(text1) if w.endswith('ableness')])

['comfortableness', 'honourableness', 'immutableness', 'indispensableness', ...]

>>> sorted([term for term in set(text4) if 'gnt' in term])

['Sovereignty', 'sovereignties', 'sovereignty']

>>> sorted([item for item in set(text6) if item.istitle()])

['A', 'Aaaaaaaaah', 'Aaaaaaaah', 'Aaaaaah', 'Aaaah', 'Aaaaugh', 'Aaagh', ...]

>>> sorted([item for item in set(sent7) if item.isdigit()])

['29', '61']

>>>

We can also create more complex conditions. If c is a condition, then not c is also a condition. If we have two conditions c1 and c2, then we can combine them to form a new condition using conjunction and disjunction: c1 and c2, c1 or c2.

OPERATING ON EVERY ELEMENT

We saw some examples of counting items other than words. Let's take a closer look at the notation we used:

>>> [len(w) for w in text1]

[1, 4, 4, 2, 6, 8, 4, 1, 9, 1, 1, 8, 2, 1, 4, 11, 5, 2, 1, 7, 6, 1, 3, 4, 5, 2, ...]

>>> [w.upper() for w in text1]

['[', 'MOBY', 'DICK', 'BY', 'HERMAN', 'MELVILLE', '1851', ']', 'ETYMOLOGY', '.', ...]

>>>

These expressions have the form [f(w) for ...] or [w.f() for ...], where f is a function that operates on a word to compute its length, or to convert it to uppercase. For now, you don't need to understand the difference between the notations f(w) and w.f(). Instead, simply learn this Python idiom which performs the same operation on every element of a list. In the preceding examples, it goes through each word in text1, assigning each one in turn to the variable w and performing the specified operation on the variable.

Let's return to the question of vocabulary size, and apply the same idiom here:

>>> len(text1)

260819

>>> len(set(text1))

19317

>>> len(set([word.lower() for word in text1]))

17231

>>>

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Now that we are not double-counting words like This and this, which differ only in capitalization, we've wiped 2,000 off the vocabulary count! We can go a step further and eliminate numbers and punctuation from the vocabulary count by filtering out any non-alphabetic items:

>>> len(set([word.lower() for word in text1 if word.isalpha()]))

16948

>>>

Nested Code Blocks

Most programming languages permit us to execute a block of code when a **conditional expression,** or if statement, is satisfied. We already saw examples of conditional tests in code like [w for w in sent7 if len(w) < 4]. In the following program, we have created a variable called word containing the string value 'cat'. The if statement checks whether the test len(word) < 5 is true. It is, so the body of the if statement is invoked and the print statement is executed, displaying a message to the user. Remember to indent the print statement by typing four spaces.

>>> word = 'cat'

>>> if len(word) < 5:

... print 'word length is less than 5'

...

word length is less than 5

>>>

When we use the Python interpreter we have to add an extra blank line in order for it to detect that the nested block is complete.

If we change the conditional test to len(word) >= 5, to check that the length of word is greater than or equal to 5, then the test will no longer be true. This time, the body of the if statement will not be executed, and no message is shown to the user:

>>> if len(word) >= 5:

... print 'word length is greater than or equal to 5'

...

>>>

e-ISSN: 2231-5152; p-ISSN: 2249-1796

An if statement is known as a **control structure** because it controls whether the code in the indented block will be run. Another control structure is the for loop. Try the

following, and remember to include the colon and the four spaces:

```
>>> for word in ['Call', 'me', 'Ram', '.']:
... print word
...
Call
me
Ram.
>>>
```

This is called a loop because Python executes the code in circular fashion. It starts by performing the assignment word = 'Call', effectively using the word variable to name the first item of the list. Then, it displays the value of word to the user. Next, it goes back to the for statement, and performs the assignment word = 'me' before displaying this new value to the user, and so on. It continues in this fashion until every item of the list has been processed.

Looping with Conditions

Now we can combine the if and for statements. We will loop over every item of the list, and print the item only if it ends with the letter l. We'll pick another name for the variable to demonstrate that Python doesn't try to make sense of variable names.

```
>>> sent1 = ['Call', 'me', 'Ram', '.']
>>> for xyzzy in sent1:
... if xyzzy.endswith('l'):
... print xyzzy
...
Call
Ram
>>>
```

e-ISSN: 2231-5152; p-ISSN: 2249-1796

You will notice that if and for statements have a colon at the end of the line, before the indentation begins. In fact, all Python control structures end with a colon. The colon indicates that the current statement relates to the indented block that follows. We can also specify an action to be taken if the condition of the if statement is not met. Here we see the elif (else if) statement, and the else statement. Notice that these also have colons before the indented code.

```
>>> for token in sent1:
... if token.islower():
... print token, 'is a lowercase word'
... elif token.istitle():
... print token, 'is a titlecase word'
... else:
... print token, 'is punctuation'
...
Call is a titlecase word
me is a lowercase word
Ishmael is a titlecase word
. is punctuation
>>>
```

This is why the Python interactive interpreter is so invaluable.

LXVI. AUTOMATIC NATURAL LANGUAGE UNDERSTANDING

We have been exploring language bottom-up, with the help of texts and the Python programming language. However, we're also interested in exploiting our knowledge of language and computation by building useful language technologies. I'll take the opportunity now to step back from the nitty-gritty of code in order to paint a bigger picture of natural language processing.

At a purely practical level, we all need help to navigate the universe of information locked up in text on the Web. Search engines have been crucial to the growth and popularity of the Web, but have some shortcomings.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

It takes skill, knowledge, and some luck, to extract answers to such questions as: God is logically Exist? What mythological sites can I visit? What do experts say about digital SLR cameras to detect GOD? What predictions about the society were made by credible priests in the past years?

Getting a computer to answer them automatically involves a range of language processing tasks, including information extraction, inference, and summarization, and would need to be carried out on a scale and with a level of robustness that is still beyond our current capabilities.

On a more philosophical level, a long-standing challenge within artificial intelligence has been to build intelligent machines, and a major part of intelligent behavior is understanding language. For many years this goal has been seen as too difficult but this time NLP technologies become more mature, and robust methods for analyzing unrestricted text become more widespread to understand it.

LXVII. WORD SENSE DISAMBIGUATION

In **word sense disambiguation** we want to work out which sense of a word was intended in a given context. Consider the ambiguous words GOD and Exist: (2)

a. GOD: help with food or drink; hold a universe; play game.

b. exist: course of meal; in INDIA; communications device

In a sentence containing the phrase: GOD help with food or drink, you can detect that both GOD

and exist are being used with their existence in food meanings. It’s unlikely that the topic of discussion shifted from sports to communication device in the space of three words. This would force you to invent bizarre images, like a artificial games taking out his frustrations on a china tea-set laid out beside the computers.

In other words, we automatically disambiguate words using context, exploiting the simple fact that nearby words have closely related meanings. As another example of this contextual effect, consider the word by, which has several meanings, for example, the book by Chesterton (agentive—Chesterton was the author of the book); the cup by the stove (locative—the stove is where the cup is); and submitby Friday (temporal—Friday is the time of the submitting). Observe in (3) that the meaning of the italicized word helps us interpret the meaning of by.

a. The lost GOD were found by the searchers (agentive)

b. The lost GOD were found by the mountain (locative)

c. The lost GOD were found by the afternoon (temporal)

e-ISSN: 2231-5152; p-ISSN: 2249-1796

PRONOUN RESOLUTION

A deeper kind of language understanding is to work out "who did what to whom," i.e. to detect the subjects and objects of verbs. You learned to do this in elementary school, but it's harder than you might think. In the sentence Lord Krishna is thief, it is easy to tell who performed the stealing action. Consider three possible following sentences in (4), and try to determine what was sold, caught, and found (one case is ambiguous).

a. The Lord Krishna stole the butter. They were subsequently sold.

b. The Lord Krishna stole the butter. They were subsequently caught.

c. The Lord Krishna stole the butter. They were subsequently found.

Answering this question involves finding the **antecedent** of the pronoun they, either thief or butter. Computational techniques for tackling this problem include **anaphora resolution** identifying what a pronoun or noun phrase refers to—and **semantic role labeling**—identifying how a noun phrase relates to the verb (as agent, patient, instrument, and so on).

GENERATING LANGUAGE OUTPUT

If we can automatically solve such problems of language understanding, we will be able to move on to tasks that involve generating language output, such as **question answering** and **machine translation**. In the first case, a machine should be able to answer a user's questions relating to collection of texts:

a. Text: ... The Lord Krishna stole the butter. They were subsequently sold. ...

b. Human: Who or what was sold?

c. Machine: The butter.

The machine's answer demonstrates that it has correctly worked out that they refers to. Butter and not to Lord Krishna. In the second case, the machine should be able to translate the text into another language, accurately conveying the meaning of the original text.

In these examples, working out the sense of a word, the subject of a verb, and the antecedent of a pronoun are steps in establishing the meaning of a sentence, things we would expect a language understanding system to be able to do.

LXVIII. MACHINE TRANSLATION

For a long time now, machine translation (MT) has been the holy grail of language understanding, ultimately seeking to provide high-quality, idiomatic translation between any pair of languages. Its roots go back to the early days of the Cold War, when the promise of automatic translation led to substantial government sponsorship, and with it, the genesis of NLP itself.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

This program submits a sentence for translation into a specified language, then submits the resulting sentence for translation back into English. It stops after 12 iterations, or if it receives a translation that was produced already (indicating a loop):

>>> babelize_shell()

NLTK Babelizer: type 'help' for a list of commands.

Babel> how long before the next flight to Alice Springs?

Babel> german

Babel> run

0> how long before the next flight to Alice Springs?

1> wie lang vor dem folgenden Flug zu Alice Springs?

2> how long before the following flight to Alice jump?

3> wie lang vor dem folgenden Flug zu Alice springen Sie?

4> how long before the following flight to Alice do you jump?

5> wie lang, bevor der folgende Flug zu Alice tun, Sie springen?

6> how long, before the following flight to Alice does, do you jump?

7> wie lang bevor der folgende Flug zu Alice tut, tun Sie springen?

8> how long before the following flight to Alice does, do you jump?

9> wie lang, bevor der folgende Flug zu Alice tut, tun Sie springen?

10> how long, before the following flight does to Alice, do do you jump?

11> wie lang bevor der folgende Flug zu Alice tut, Sie tun Sprung?

12> how long before the following flight does leap to Alice, does you?

Observe that the system correctly translates Alice Springs from English to German (in the line starting 1>), but on the way back to English, this ends up as Alice jump (line 2). The preposition before is initially translated into the corresponding German preposition vor, but later into the conjunction bevor (line 5). After line 5 the sentences become non-sensical (but notice the various phrasings indicated by the commas, and the change from jump to leap). The translation system did not recognize when a word was part of a proper name, and it misinterpreted the grammatical structure. The grammatical problems are more obvious in the following example. Did John find the God, or did the God find John?

>>> babelize_shell()

Babel> The God that John found looked happy

Babel> german

Babel> run

0> The God that John found looked happy

1> Das Schwein, das John fand, schaute gl?cklich

2> The God, which found John, looked happy

Machine translation is difficult because a given word could have several possible translations (depending on its meaning), and because word order must be changed in keeping with the grammatical structure of the target language. Today these difficulties are being faced by collecting massive quantities of parallel texts from news and government websites that publish documents in two or more languages. Given a document in German and English, and possibly a bilingual dictionary, we can automatically pair up the sentences, a process called **text alignment**. Once we have a million or more sentence pairs, we can detect corresponding words and phrases, and build a model that can be used for translating new text.

LXIX. SPOKEN DIALOGUE SYSTEMS

In the history of artificial intelligence, the chief measure of intelligence has been a linguistic one, namely the **Turing Test**: can a dialogue system, responding to a user's text input, perform so naturally that we cannot distinguish it from a human-generated response?

In contrast, today's commercial dialogue systems are very limited, but still

perform useful functions in narrowly defined domains, as we see here:

S: How may I help you?

U: When is Saving Private Ryan playing?

S: For what theater?

U: The Paramount theater.

S: Saving Private Ryan is not playing at the Paramount theater, but it's playing at the Madison theater at 3:00, 5:30, 8:00, and 10:30.

You could not ask this system to provide driving instructions or details of nearby restaurants unless the required information had already been stored and suitable question answer pairs had been incorporated into the language processing system.

Observe that this system seems to understand the user's goals: the user asks when a movie is showing and the system correctly determines from this that the user wants to see the movie. This inference seems so obvious that you probably didn't notice it was made, yet a natural language system needs to be endowed with this capability in order to interact naturally. Without it, when asked, Do you know when Saving Private Ryan is playing?, a system might unhelpfully respond with a cold Yes. However, the developers of commercial dialogue systems use contextual assumptions and business logic to ensure that the different ways in which a user might express requests or provide information are handled in a way that makes sense for the particular application. So, if you type When is ..., or I want to know when ..., or Can you tell me when ..., simple rules will always yield screening times. This is enough for the system to provide a useful service.

Dialogue systems give us an opportunity to mention the commonly assumed pipeline for NLP. Figure 1-5 shows the architecture of a simple dialogue system. Along the top of the diagram, moving from left to right, is a "pipeline" of some language understanding **components**. These map from speech input via syntactic parsing to some kind of meaning representation. Along the middle, moving from right to left, is the reverse pipeline of components for converting concepts to speech. These components make up the dynamic aspects of the system. At the bottom of the diagram are some representative bodies of static information: the repositories of language-related data that the processing components draw on to do their work.

For an example of a primitive dialogue system, try having a conversation with an chatbot. To see the available chatbots,run nltk.chat.chatbots().

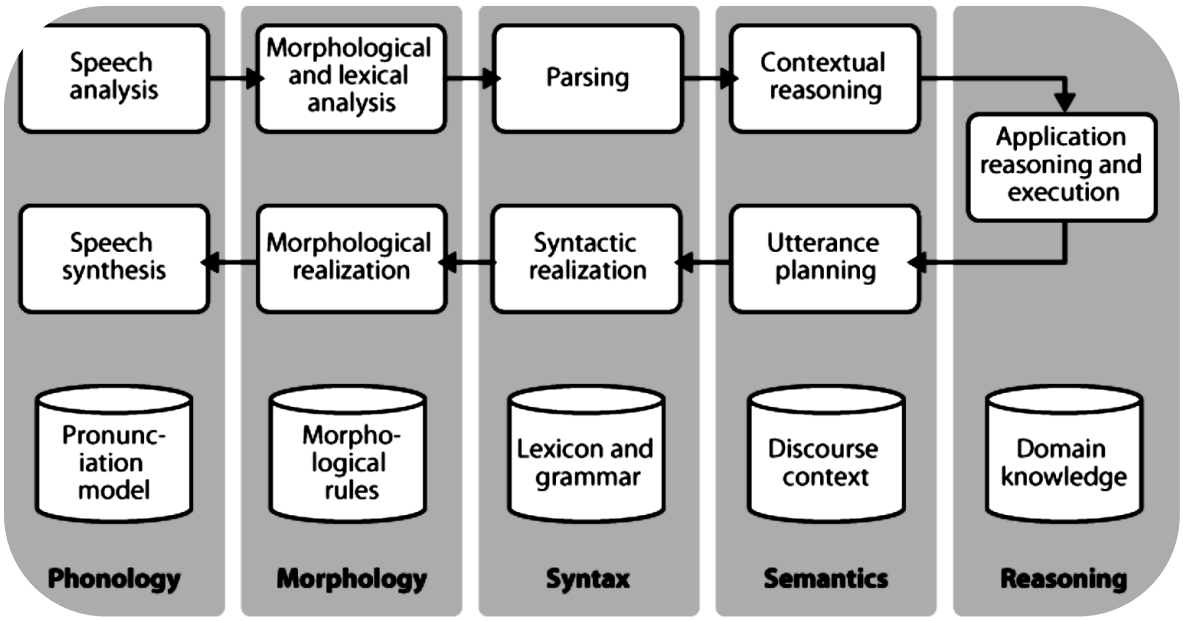


Figure 1-5. Simple pipeline architecture for a spoken dialogue system: Spoken input (top left) is analyzed, words are recognized, sentences are parsed and interpreted in context, application-specific actions take place (top right); a response is planned, realized as a syntactic structure, then to suitably inflected words, and finally to spoken output; different types of linguistic knowledge inform each stage of the process

e-ISSN: 2231-5152; p-ISSN: 2249-1796

LXX. TEXTUAL ENTAILMENT

The challenge of language understanding has been brought into focus in recent years by a public "shared task" called Recognizing Textual Entailment (RTE). The basic scenario is simple. Suppose you want to find evidence to support the hypothesis: Sandra Goudie was defeated by Max Purnell, and that you have another short text that seems to be relevant, for example, Sandra Goudie was first elected to Parliament in the 2002 elections, narrowly winning the seat of Coromandel by defeating Labour candidate Max Purnell and pushing incumbent Green MP Jeanette Fitzsimons into third place. Does the text provide enough evidence for you to accept the hypothesis? In this particular case, the answer will be "No." You can draw this conclusion easily, but it is very hard to come up with automated methods for making the right decision. The RTE Challenges provide data that allow competitors to develop their systems, but not enough data for

"brute force" machine learning techniques. Consequently, some linguistic analysis is crucial. In the previous example, it is important for the system to note that Sandra Goudie names the person being defeated in the hypothesis, not the person doing the defeating in the text. As another illustration of the difficulty of the task, consider the following text-hypothesis pair:

(7) a. Text: David Golinkin is the editor or author of 18 books, and over 150

responsa, articles, sermons and books

b. Hypothesis: Golinkin has written 18 books

In order to determine whether the hypothesis is supported by the text, the system needs the following background knowledge: (i) if someone is an author of a book, then he/ she has written that book; (ii) if someone is an editor of a book, then he/she has not written (all of) that book; (iii) if someone is editor or author of 18 books, then one cannot conclude that he/she is author of 18 books.

Despite the research-led advances in tasks such as RTE, natural language systems that have been deployed for real-world applications still cannot perform common-sense reasoning or draw on world knowledge in a general and robust manner. Accordingly, right from the beginning, an important goal of this NLP research has been to make progress on the difficult task of building technologies that "understand language," using superficial yet powerful techniques instead of unrestricted knowledge and reasoning capabilities. Indeed, this is one of the goals of this thesis, and we hope to equip you with the knowledge and skills to build useful NLP systems, and to contribute to the long-term aspiration of building intelligent machines.

NEED FOR MACHINE LEARNING

MACHINE LEARNING is subset of AI which provides machines the ability to learn automatically and improve with experience without being explicitly programmed to do so.

In the sense, it is the practice of getting machines to solve problems by gaining the ability to think.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

But now you might be thinking how can a machine think or make decisions. Now machines are very similar to humans. If you feed a machine a good amount of data, it will learn how to interpret, process, and analyze this data by using machine learning algorithms, and it will help you solve world problems. So what happens here is a lot of data is fed to the machine. The machine will train on this data and it will build a predictive model with the help of MACHINE LEARNING algorithms in order to predict some outcome or in order to find some solution to a problem. So it involves data. You are train the machine and build a model by using MACHINE LEARNING algorithms in order to predict some outcome or to find a solution to a problem. So that is a simple way of understanding what exactly machine learning is.

LXXI. DEFINITIONS

i. **ALGORITHM** - Machine Learning algorithm is a set of rules and statistical technique that is used to learn patterns from data and draw significant information from it. The logic behind a machine learning model is basically the machine learning algorithm. Example of a ML algorithm is LINEAR REGRESSION, or DECISION TREE, or a RANDOM FOREST. All of these are machine learning algorithms which define the logic behind a machine learning model.

ii. **MODEL** - A model is actually the main component of a machine learning process. So a model is trained by using a MACHINE LEARNING Algorithm. The difference between an algorithm and a model is that an algorithm maps all the decisions that a model is supposed to take based on the given input in order to get the correct output. So the model will use the machine learning algorithm in order to draw useful insights from the input and give you an outcome that is very precise. That is the ML model.

iii. **Predictor Variable**: Predictor Variable is any feature(s) of the data that can be used to predict the output. Example - Lets you are trying to predict the height of a person, depending on his weight so here your predictor variable becomes your weight, because you are using the weight of a person to predict the person's height. So your predictor variable becomes your weight.

iv. **Response Variables**: Response Variable is also known as target variable or the output variable. This is the variable that you are trying to predict by using the predictor variables. So the response variable is the feature or the output variable that needs to be predicted by using the predictor variable(s)

v. **Training Data**: Training and Testing data are terminologies that you will come across very often in a ML process. So training data is basically the data that is used to create the machine learning model. So, basically in a machine learning process, when you feed data into the machine, it will be divided into two parts. So splitting the data into two parts is also known as data splicing. So you will take your input data, you will divide it into two sections. One you will call the training data, and the other you will call the testing data. So then you have something known as the testing data. The training data is basically used to create the machine learning model. The training data helps the model to identify key trends and patterns which are essential to predict the output. Now the testing data is after the model is trained, it must be tested in order to evaluate how accurately it can predict an outcome. Now this is done by using the testing data. So, basically, the training data is used to train the model. The testing data is used to test the efficiency of the model.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

LXXII. MACHINE LEARNING PROCESS

This process involves building a Predictive Model that can be used to find a solution for a Problem Statement. In order to solve any problem in ML there are couple of steps we need to follow.

1. **Define Objective**
2. **Data Gathering**
3. **Preparing Data**
4. **Data Exploration**
5. **Building a model**
6. **Model Evaluation**
7. **Predictions**

STEP – 1: DEFINE THE OBJECTIVE OF THE PROBLEM

So basically we look **questions**

g. What are we trying to predict?

In order to understand the ML process, let's assume that you have been given a problem that needs to be solved by using machine learning. So the problem that you need to solve is we need to predict the occurrence of rain in your local area by using ML. **So basically, you need to predict the possibility of rain by studying the weather conditions. So what we did here is we basically looked at step number one, which is defining the objective of the problem. Now here you need to answer questions such as what are we trying to predict. Is that output going to be a continuous variable, or is it going to be a discreet variable? These are the kinds of questions that you need to answer in the first step, which is defining the objective of the problem.**

g. What are the target features?

So here you need to understand what your target variables and what are the different predictor variables that you need in order to predict the outcome. So here our target variable will be basically a variable that can tell us whether it is going to rain or not.

h. What is the input data?

Input data is well need data such as maybe the temperature on a particular day or the humidity level, the precipitation, and so on. So you need to define the objective at this stage. So basically, you have to form an idea of the problem at this stage.

i. What kind of problem are we solving?

Another question that you need to ask yourself is and what kind of problem are you solving.

j. Binary classification, clustering or this is a regression problem?

e-ISSN: 2231-5152; p-ISSN: 2249-1796

k. Is this a binary classification problem, or is this a clustering problem, or is this a regression problem?

All you need to understand at step one is you need to define how you are going to solve the problem. You need to understand what sort of data you need to solve the problem, how you are going to approach the problem, what are you trying to predict, what variables you will need in order to predict the outcome, and so on.

STEP 2 - DATA GATHERING -Data such as weather conditions, humidity level, temperature, pressure, etc. are either collected manually or scarped from the web.

In this stage, you must be asking question such as, what kind of data is needed to solve this problem. And is this data available? And if it is available, from where can I get this data and how can I get the data? Data gathering is one of the most times - consuming steps in machine learning process.

If you have to go manually and collect the data, it is going to take a lot of time. But lucky for us, there are a lot of resources online, which were wide data sets. All you need to do is web scraping where you just have to go ahead and download data. One of the websites i can tell you all about is Cargill. So if you are a beginner in Machine Learning, don't worry about data gathering and all of that. All you have to do is go to websites such as Cargill and just download the data set. So coming back to the problem that we are discussing which is predicting the weather, the data needed for weather forecasting includes measures like humidity level, the temperature, the pressure, the locality, whether or not you live in a hill station, such data has to be collected or stored for analysis so all the data is collected during the data gathering stage. This step is followed by data preparation, or also known as data cleaning.

FOR EXAMPLE -

SHORT OVERVIEW OF INTENSE FEELINGS

Today I feel love for you again

Today I feel love for you again

Today I feel love for you again

It is limitless and infinite.

Today I feel love for you again

Today I feel love for you again

It is limitless and infinite.

I broke and fell in Your arms in such a way

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Like a leaf falls from a tree carelessly

You broke me but I finally got united with You

You took away everything of mine

I had no worries, shame or care for even a moment

In every cell of mine, there's a desire to see You

In every cell of mine, there's a desire to see You

It is limitless and infinite.

Today I feel love for you again

Today I feel love for you again

It is limitless and infinite.

You are my carefreeness

You are my evening prayer

You are reasonless essential to me

You are my desire yet you are missing

And you are that quest whom1

These chains of events brought to me.

Your lips are expressing (something)

Your lips are expressing (something)

It is limitless and infinite.

Today I feel love for you again

Today I feel love for you again

It is limitless and infinite.

Today I feel love for you again

Today I feel love for you again

It is limitless and infinite.

Deep feelings of the most beautiful word

"HONEYMOON" at the moment when a lady asked my desire

At dark night at 9:30 pm.

Lady Call from 9999XXXXX

Hey! How are you?

I am calling from Universe-My name is "S"; from 5th dimension we don't have your kind of visitors in training of NIDHI VAN.

You need "HONEYMOON" " SHER O SHAYARI" but it cannot be applicable in 5th dimension. We can only dance and enjoy the late hours of night.

I expressed my intense feelings again;

"I want to meet Lord Krishna and I think I am deemed fit to do romance on the roofs in the rain with him.

Please, tell him just like that.

I will be highly obelized

My training must be like Honeymoon Period in 5th dimension with him.

But she became confused and suggested,

"You have to consider again,

e-ISSN: 2231-5152; p-ISSN: 2249-1796

"Detachment will be first condition for HONEYMOON with him".

You have to detached yourself from 4th dimension just like divorce.

Suddenly,

"Goddess of Fragrance", come into picture by conference call with "S",

"I have an Idea" with rain"

"if you want to romance with LORD KRISHNA"

Feel like

The water is falling drop by drop

The water has started a fire

When my heart is on fire

Then my heart is remembering you

Since I am remembering you

My whole drenched body is burning

Beloved, now you only tell me what I should do

Your name has come on my lips

I call you with an excuse

But the rains come hard, what should I do

The water is falling drop by drop

The water has started a fire

When my heart is on fire

Then my heart is remembering you

Since I am remembering you

My whole drenched body is burning

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Beloved, now you only tell me what I should do

I drowned in the sea by standing on the shore

You fell like lightning on me

A rogue wind is blowing, what should I do

The water is falling drop by drop

The water has started a fire

When my heart is on fire

Then my heart is remembering you

Since I am remembering you

The passion of love is all over me

My heart is not in my control, what I should do

By this

You can win 4th dimension world if you follow the terms and conditions of HONEY MONTH of Lord Krishna.

"Oh, okays, what should I do? What will complete me? ", I asked.

Goddess of Fragrance replied,

"Victory on intense exaltation of mind and feelings in "Honey Month", a goddess of fragrance commanding does work of creativity for Lord Krishna who has grown into iconic leading brands with Tech Mahindra and detach yourself from materialistic things".

I must say to the contact number "For Sure you are absolutely right" but why you marked my absenteeism in 5th day training as I was present for 5th dimension

She replied,

You were failed on 5thday training,

You were not able to detach yourself from 4th dimension completely.

"Oh! Okays".

First you have to qualify then you can enter in 5th dimension on 5th day training.

What I have to follow? I asked.

Do not skip clean yourself. Clean your body and mind with spiritual laws.

"Thank you", I expressed my gratitude.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

And then,

She said,

"Your mind was stuck in the middle of office work but you forget, other minds could dash into it but don't worry, you are safe.

I asked again,

"But how do you know what's going on in my mind?

Was there any kind of James Bond kind of training?

She replied, "Once you sent message to "Goddess of fragrance" that you are interested to read "Hanuman Chalisa"

So, it was just guessing work.

I look into her eyes and observed,

Her eyes considered me

Worthy for Honeymoon love

My heart - beat just hold

I got my destination

Her eyes considered me

Yes, I agree with this

Decision of her

Yes, I agree with this

These eyes are saying

Thanks to the God

Here we can understand the intense love for LORD KRISHNA by

CHAPTER XII of Bhagavad Gita *Bhakityog* – *T*he Path of Devotion

In this Chapter, Lord Krishna extols the glory of true devotion to God and explains the different forms of spiritual disciplines.

CHAPTER 12: BHAKTI YOG

The Yog of Devotion

This small chapter stresses on the super-excellence of the path of loving devotion over all other types of spiritual practices. It begins with Arjun asking Shree Krishna whom He considers more perfect in Yog—those who are devoted to the personal form of God or those who worship the formless Brahman. Shree Krishna responds by declaring that both paths lead to God-realization. However, He regards the devotees of His personal form as the best yogis. He explains that meditation on the impersonal unmanifest aspect of God is full of tribulations and is exceedingly difficult for embodied beings. But devotees of the personal form, with their consciousness merged in Him and all their actions dedicated to Him, are swiftly delivered from the cycle of life and death. Shree Krishna thus asks Arjun to surrender his intellect to Him, and fix his mind in exclusive loving devotion on Him alone.

However, such love is often not forthcoming in the struggling soul. So Shree Krishna gives other options, and says that if Arjun cannot immediately reach the stage of complete absorption of the mind in God, he should strive to reach that stage of perfection by constant practice. Devotion is not a mysterious gift and can be cultivated by regular effort. If Arjun cannot do even this much, he should still not admit defeat; rather he should work in devotion for the pleasure of Shree Krishna. If this is also not possible, then he should merely renounce the fruits of his works and be situated in the self. He then explains that higher than mechanical practice is the cultivation of knowledge; higher than the cultivation of knowledge is meditation; and higher than meditation is the renunciation of fruits of actions, which immediately leads to great peace. The remaining verses of the chapter describe the wonderful qualities of God's loving devotees who are very dear to Him.

STEP 3 - PREPARING DATA - Data cleaning involves getting rid of inconsistencies in data such as missing value or redundant variables.

So if you are going around collecting data, it almost never in the right format. And even if you are taking data from online resources from any website, even then, the data will require cleaning and preparation. The data is never in the right format. You have to do some sort of preparation in order to make the data ready for analysis. So what you will encounter while cleaning data is you will encounter a lot of inconsistencies in the data set, like you will encounter some missing values, redundant variables, duplicate values, and all of that. So removing such inconsistencies is very important, because they might lead to any wrongful computations and predictions. So at this stage you can scan the data set for any inconsistencies and you can fix them then and there. So, all

the data is collected during the data gathering stage. This step is followed by data preparation, or also known as data cleaning.

- ✓ Transform data into desired format
- ✓ Data cleaning
- ❖ Missing Values
- ❖ Corrupted data
- ❖ Remove unnecessary data

STEP 4 - EXPLORATORY DATA ANALYSIS - So, here you basically become a detective in the stage. So this stage, which is EDA or Exploratory Data Analysis, is like the brainstorming stage of machine learning. Exploratory Data Analysis involves understanding the patterns and trends in your data. At this stage all the useful insights are drawn and any co - relations between the variables are understood. What do I mean by trends and patterns and correlations?

Example - which is we have to predict the rainfall on a particular day. So we know that there is a strong possibility of rain if the temperature has fallen law. So we know that our output will depend on variables such as temperature, humidity, and so on. Now to what level it depends on these variables, we will have to find out the patterns, and we have to find out the correlations between such variables. So such patterns and trends have to be understood and mapped at this stage. So this is what exploratory data analysis is about. This is where you will understand what exactly your data is and how you can form the solution to your problem.

STEP 5 - BUILDING MACHINE LEARNING MODEL -

At this stage a predictive model is built by using MACHINE LEARNING Algorithm such as linear regression, decision trees, etc.

3. MACHINE LEARNING model is built by using the training data set.
4. The model is the MACHINE LEARNING algorithm that predicts the output by using the data fed to it.

So, all the insights and the patterns that you derive during the data exploration are used to build a machine learning model. So this stage always begins by splitting the data set into two parts, which is training data and testing data. So, when you building a model you always use the training data. So you always make use of the training data in order to build the model.

What is training Data?

Training data is the same input data that you are feeding to the machine. The only difference is that you are splitting the data set into two. You randomly picking 80% of your data and you are assigning for training purpose. And the rest 20%, probably, you will assign it for testing purpose. Another thing that the training data is always much more than your testing data, obviously because you need to train your machine. And the more

data you feed the machine during the training phase, the better it will be during the testing phase. Obviously, it will predict better outcomes if it is being trained on more data.

So the model is basically using the ML algorithm that predicts the output by using the data fed to it. Now in the case of predicting rainfall, the output will be a categorical variable, because we will be predicting whether it is going to rain or not. So let's say we have an output variable called rain. The two possible values that this variable can take is yes it is going to rain and no it won't rain. So that is outcome.

Our outcome is a classification or a categorical variable. So for such cases where your outcome is a categorical variable, you will be using classification algorithms.

Example of a classification algorithm is logistic regression or you can also support vector machines, you can use K nearest neighbor, and you can also use naïve Bayes, and so on.

Now like I said, choosing the ML algorithm depends on the problem statement that you are trying to solve because of N number of ML algorithms. We will have to choose the algorithm that is most suitable for your problem statement.

For Example

A COGNITIVE MODEL OF APPROXIMATION WITH POSITIVE THINKING

Let's take scenario of

Mail dated 15th August, 2020

A cognitive model is an approximation

Ekta Singh <singhsisterslegalservices@gmail.com> 2:11 PM (5 hours ago)

to Hina.bisht, Anand.Mahindra, Sujit.Bakshi, kalyan.krishnamurthy

Keep your family protected with

LORD KRISHNA.

Let's play with the below mentioned names and suggest magical messages.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Are you familiar with names? But you are not familiar with hidden messages behind these names.

ANAND - Ecstasy

SUJIT - Victory

HINA - A Goddess of fragrance

HONEYMOON - Honey Month

KRISHNAMURTHY- Lord Krishna

SHILPA- Art of work

DIVORCE - Detachment

MAGICAL MESSAGE WILL BE

Victory on intense exaltation of mind and feelings in "Honey Month", a goddess of fragrance commanding does work of creativity for Lord Krishna who has grown into iconic leading brands with Tech Mahindra and detach yourself from materialistic things.

A peaceful and calm environment is the right place to breed prosperity and good deeds and thoughts. A destructive and unstable environment breeds destruction, stagnation and hate.

Kind Regards,

Ekta Singh

Shree Krishna resolves the apparent confusion of the Hindu pantheon by explaining that the one God is the sole object of worship. He is the goal, the support, the refuge, and the one true friend of all living beings

So, we can relate this magical message with CHAPTER IX of Bhagavad Gita: Confidential Knowledge of the Supreme Truth

"I am Time" Among the Daily as (demons and giants), I am Prahlada; among measurers, I am time; among the animals, I am the king of beasts (the lion); and among birds, I am Garuda ("lord of the skies," vehicle of Vishnu). –The Bhagavad Gita X:30

God is the Eternal Consciousness, unchanging and indivisible, in which the illusions of time (change) and space (division) present an infinite variety of forms interacting in a progressive mode of past, present, and future.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

When a dreamer travels around the world in his dream, he does so, not in space and time, but in his consciousness only. Similarly, the cosmic dream is occurring neither in vast space nor in a series of past, present, and future time, but in the Eternal Now of God's dream consciousness. Because Jesus was attuned to this eternal consciousness, he could say: "Before Abraham was, I am."[John 8:58] He knew his everlastingness was in no manner interrupted by the illusory changes called birth, existence, and death.

God has no respect for "history," man's limited and erroneous measuring conceptions of time and space, for He can produce any past being, object, or event instantaneously in His ever-present dream consciousness.

Likewise, in a second, He can dissolve this world and its beings—or the entire cosmos—and then bring them back at will, just as they were. All He has to do is to stop dreaming thisworld and it ceases to be; or He can dream it back again by materializing it in His consciousness. These capricious categories of time and space are offshoots of the Cosmic Dreamer's fancy By Divine Imaginings, dream pictures of universes can be made to appear and disappear in the tiniest space and minutest moment in a single frozen thought of the Cosmic Dreamer.

Devotees who realize the dream nature of this cosmos and the dreaming power of God no longer rely on the misleading illusions of Nature's measurers, the conclusions from which make creation seem often harsh and unjust. They look to the Eternal Consciousness, the Sole Time, that knows no distress of change—Immutable Time, referred to in X:33. (God Talks with Arjuna

Beyond the Material World VIII:3 The Blessed Lord replied: The Indestructible and Supreme Spirit is Brahman. Its undifferentiated manifestation (as Kutastha Chaitanya and as the individual soul) is called Adhyatma. The Aum (Cosmic Vibration or the Visarga) that causes the birth and sustenance and dissolution of beings and their various natures is termed Karma (cosmic action). VIII:7 Therefore, remember Me always, and engage thyself in the battle of activity! Surrender to Me thy mind and thine understanding! Thus without doubt shalt thou come unto Me. VIII:9-10 At the time of death a yogi reaches the Supreme Effulgent Lord if, with love and by the power of yoga, he fully penetrates his life force between the eyebrows (the seat of the spiritual eye), and if he fixes his mind unwaveringly on the Being who, beyond all delusions of darkness, shines like the sun—the One whose form is unimaginable, subtler than the finest atom, the Supporter of all, the Great Ruler, eternal and omniscient. [—Commentary] VIII:12-13 He who closes the nine gates of the body, who cloisters the mind in the heart center, who fixes the full life force in the cerebrum—he who thus engages in the steady practice of yoga, establishing himself in Aum, the Holy Word of Brahman, and remembering Me (Spirit) at the time of his final exit from the body, reaches the Highest Goal.[—Commentary] Progress Depends on Effort VIII:14 O Partha (Arjuna)! I am easily reached by that yogi who is single-hearted, who remembers Me daily, continually, his mind intensely focused only on Me. [—Commentary] VIII:20 But transcending the unmanifested (states of phenomenal being) there exists the true Unmanifested, the Immutable, the Absolute, which remains untouched by the cycles of cosmic dissolution. Devotion (Bhakti) VIII:21-22 The aforesaid Unmanifested, the Immutable Absolute, is thus called the Supreme Goal. Those who attain it. My highest state, undergo no more rebirth. By singlehearted devotion, O son of Pritha (Arjuna), that Supreme Unmanifested is reached. He alone, the Omnipresent, is the Abode of all creatures. [—Commentary] VIII:23-24 I shall now declare unto thee, O Best of the Bharatas (Arjuna), the path, traversing which at the time of death, yogis attain freedom; and also the path

wherein there is rebirth. Fire, light, daytime, the bright half of the lunar month, the six months of the northern course of the sun—pursuing this path at the time of departure, the knowers of God go to God

STEP 6 - **MODEL EVALUATION & OPTIMIZATION** -

Model evaluation and optimization is nothing but you are testing how well your model can predict the outcome. So at this stage, you will be using the testing data set.

Once you have tested your model, you need to calculate the accuracy. You need to calculate how accurately your model is predicting the outcome.

The efficiencies of the model is evaluated and any further improve in the model are implemented.

- Machine Learning model is evaluated by using the data set.
- The accuracy of the model is calculated
- Further improvements in the model are done by using techniques like Parameter tuning and cross validation methods in order to improve the performance of the model.

STEP 7 - PREDICTIONS - Once a model is evaluated and once you have improved it, it is finally used to make predictions. The final outcome can either be a categorical variable or a continuous variable. All of this depends on your problem statement.

In our case we are predicting the occurrence of rainfall; the output will be categorical variable. It is obvious because we are predicting whether it is going to rain or not. The result, we understand that this is a classification problem because we have a categorical variable.

LXXIII. TYPES OF MACHINE LEARNING

1. **SUPERVISED LEARNING**
2. **UNSUPERVISED LEARNING**
3. **REIGNFORCEMENT LEARNING**

SUPERVISED LEARNING

Supervised learning is a technique in which we teach or trained the machine using data which is well **LABELED. Now, in order to understand supervised learning, let's consider a small example. So, as kids, we all needed guidance to solve math problems. A lot of us had trouble solving math problems. So our teachers always help us understand what addition is and how it is done. Similarly, you can do with Python.**

For Example -

❖ **Python Program to Check if a number is Odd or Even**

```
num = int(input("Enter a number:  "))
if (num % 2) == 0;

Print("{0} is Even".format (num))

else:
print("{0} is Odd".format(num))
```

>>Output:

```
Enter a number: 43
43 is Odd
```

❖ **PYTHON PROGRAM TO MAKE A SIMPLE CALCULATOR**

```
# This function adds two numbers

def add(x, y):

    return x + y

# This function subtracts two numbers

def subtract(x, y):

    return x - y

# This function multiples two numbers

def multiply(x, y):

   return x*y

# This function divides two numbers

def divide(x, y)

   return x / y

   print ( "Select  operation.")

   print ("1. Add")
```

e-ISSN: 2231-5152; p-ISSN: 2249-1796

```
print ("2. Subtract")
print ("3. Multiply")
print ("4. Divide")
Take input from the user
choice = input ("Enter choice(1/2/3/4):")
num1 = int (input( "Enter first number : "))
num2 = int (input( "Enter second  number : "))
If choice  == '1':
  print (num1,"+",num2,"=", add(1num,num2))
  elif choice == '2' :
          print (num1,"-",num2,"=", subtract (1num,num2))
  elif choice == '3' :
          print (num1,"*",num2,"=", multiply (1num,num2))
  elif choice == '4' :
          print (num1,"/",num2,"=", divide (1num,num2))
    else:
        print ("Invalid input")
```

```
>>Output:
Select operation.
1. Add
2. Subtract
3. Multiply
4. Divide
          Enter choice (1/2/3/4) : 3
          Enter first number : 2
Enter second number : 4
```

```
2 * 4 = 8
```

❖ **Python Program to Transpose a Matrix**

```
x = [[12,7],
  [4 ,5],
  [3 ,8]]

result = [[0,0,0],
     [0,0,0]]

# iterate through rows
for i in range(len(x)):
# iterate through columns
for j in range(len(x[0])):
result[j][i] = x[i][j]

for r in result:
print( r )
```

>>Output:

```
[12,  4,  3]
[7,  5,  8]
```

❖ **Calculate the sum of first n natural numbers**

```
n = input("Enter Number to calculate sum")
n = int (n)
sum = 0
While (n >= 0):
Sum += n
```

n - = 1
Print ("sum using while loop", sum)
Average = sum /total_numbers
Print("Average using a while loop", average

>>Output

```
sum using while loop 210
Average using a while loop 10.5
```

❖ **Python Program to find the Square Root**

num = 8
num_sqrt = num 0.5**
Print('The square root of %0.3f is %0.3f'%)

>>Output:

```
The square root of 8.000 is 2.828
```

Similarly, you can think of supervised learning as a type of machine learning that involves a guide. The label data set is a teacher that will train you to understand the patterns in the data. So the label data set is nothing but the training data set. So, to understand supervised learning better,

Let's look at the figure on the screen.

LABELLED DATA

RADHA

DATA CLEANING ALGORITHM LABELLED OUTPUT

EDA MODEL EVALUATION

CLASS RADHA

TRAINING PHASE

CLASS RADHA KRISHNA

RADHA KRISHNA

KNOWN OUTPUT

e-ISSN: 2231-5152; p-ISSN: 2249-1796

SUPERVISED LEARNING

SUPERVISED LEARNING IS A TECHNIQUE IN WHICH WE TEACH OR TRAIN THE MACHINE USING DATA WHICH IS WELL LABELLED

Here we are feeding the machine image of RADHA and RADHA KRISHNA, and the goal is for the machine to identify and classify the images into two classes. One will contain images of RADHA and the other will contain images of RADHA KRISHNA. Now the main thing that you need to note in supervised learning is a training data set. The training data set is going to be very well labeled. Basically, what we are doing is we are telling the machine this is how RADHA looks and this is how RADHA KRISHNA looks. By doing this, you are training the machine by using label data. So the main thing that you are doing is you are labeling every input data that you are feeding to the model. So, basically, your entire training data set is labeled. Whenever you are giving an image of RADHA, there is going to be a label there saying this is RADHA. And when you are giving an image of RADHA KRISHNA, you are saying that this is how RADHA KRISHNA looks. So, basically, you are guiding the machine and you are telling that, "Listen, this is how RADHA looks, this is how RADHA KRISHNA looks "and now you need to classify them into two different classes." That is how supervised learning works.

LXXIV. MATHEMATICAL DEFINITION OF SUPERVISED LEARNING

where you have input variables X and an output variable Y and you use an algorithm to learn the mapping function from the input to the output. That is Y affects. The goal is to approximate the mapping function. So well that whenever you have a new input data. X you could predict the output variable.

Example - **Cortana, Weather App, Biometric Attendance, Banking sectors - Predict Credit Worthiness of credit card holder. Healthcare Sector - It is used to predict the patient's readmission rates. Retail Sector - Analyze products Customers buy Together.**

UNSUPERVISED LEARNING - UNLABELED DATA

This involves training by using unlabeled data and allowing the model to act on that information without any guidance. Like the name suggests itself, there is no supervision here. It is unsupervised learning. So think of unsupervised learning as a smart kid that learns without any guidance. In this type of ML, the model is not fed with any label data, as in the model has no clue that this is the image of Tom and this is Jerry. It figures out patterns and the difference between Tom and Jerry on its own by taking in tons and tons of data. Now how do you think the machine identifies this as Tom, and then finally gives us the output like yes this is Tom, this is Jerry. For

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Example, it identifies prominent features of Tom, such as pointy ears, bigger in size, and so on, to understand that this image is of type one. Similarly, it finds out features in Jerry, and knows that this image is of type two, meaning that the first image is different from the second image. So what the unsupervised learning algorithm or the model does is it will form two different clusters. It will form one cluster which are very similar, and the other cluster which is very different from the first cluster. That is how unsupervised learning works.

The important thing in unsupervised learning you have to fed the unlabeled data. The machine has to understand the patterns and discover the output on its own. And finally, the machine will form clusters based on feature similarity.

Mathematically unsupervised learning is where you have only have input data X and no corresponding output variable. The goal for unsupervised learning is to model the underlying structure or distribution in the data in order to learn more about the data.

Example - Let's see you have never seen football match before and by chance you watch a video on the internet. Now, you can easily classify the players on the basis of different criterion, like player wearing the same kind of jersey are in one class player wearing different kind of jersey aren't different class or you can classify them on the basis of their playing style like the guys are attacker so he is one class, he is a defender he is in another class or you can classify by them whatever you observe the things in match

Unsupervised Learning in Bank - Segment Customers by behavioral characteristics

Unsupervised Learning in Healthcare - Categorize the MRI data by normal or abnormal images.
Unsupervised Learning in Retail Sector Recommend Products to Customers on Past Purchase.

LXXV. REINFORCEMENT LEARNING - TRIAL AND ERROR METHOD

Reinforcement Learning is a part of MACHINE LEARNING where an agent is put in an environment and he learns to behave in this environment by performing certain actions and observing the rewards which it gets from those actions.

Example -

- **Reinforcement Learning in bank - Create 'Next Best Offer' Model for the call center.**
- **Reinforcement Learning in healthcare - Allocate Scarce Medical Resources to handle different ER cases by building a Markov decision process.**

e-ISSN: 2231-5152; p-ISSN: 2249-1796

- **In Retail Sector - Reduce excess stock with dynamic pricing.**
- **Self - driving Cars and AlphaGo.**

TYPES OF PROBLEMS SOLVED USING MACHINE LEARNING

In MACHINE LEARNING all the problems can be classified into three types. Every problem that is approached in MACHINE LEARNING can be put into one of these three categories. So the first type is regression then we have classification and clustering.

1. REGRESSION - In this type of problem the output is always a continuous quantity. For Example if you want to predict the speed of a car, given the distance, it is a regression problem. What exactly is continuous quantity is? A continuous quantity is any quantity that can have an infinite range of values. For Example, The weight of a person, it is a continuous quantity, because our weight can be 50, 50.1, 50.001, 5.0021, 50.0231, and so on. It can have an infinite range of values. So the type of problem that you have to predict a continuous quantity to make use of regression algorithms. So regression problems can be solved by supervised learning algorithms. Like linear regression.

a. **Supervised learning**
b. **Output is a continuous quantity. Example - Speed of Car**
c. **Main Aim is to forecast or predict - Ex - Predict Stock Market Price**
d. **Algorithm Linear Regression**

2 - CLASSIFICATION - In this type of problem output is always categorical value. It can be value such as gender of a person is a categorical value. Now classifying emails into two classes like spam and non - spam is a classification problem that can be solved by using supervised learning classification algorithms, like support vector machines, naïve Bayes, logistic regression, K nearest neighbor, and so on.

a. **Supervised Learning**
b. **Output is a categorical quantity**
c. **Main Aim to compute the category**
d. **Main Aim to compute the category of the data. Example - Classify emails or spam or non - spam**
e. **Algorithm Logistic Regression.**

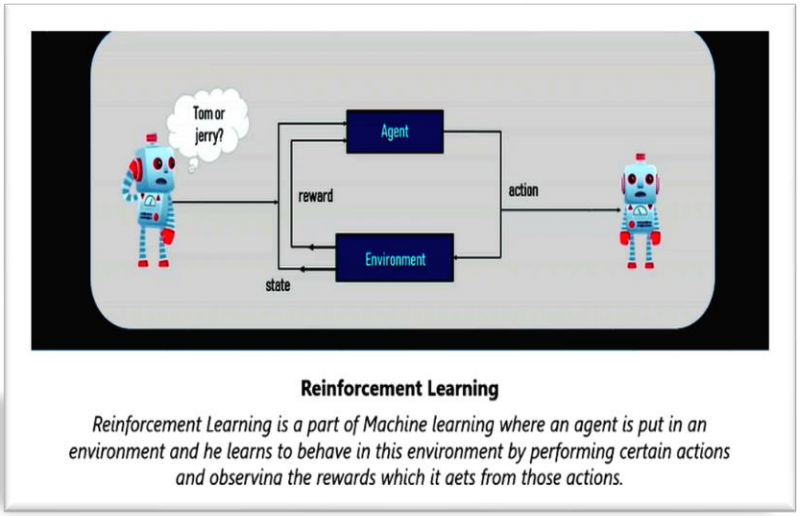
e-ISSN: 2231-5152; p-ISSN: 2249-1796

LXXVI. CLUSTERING

This type of problems involves assigned input into two or more clusters based on feature similarity. This is unsupervised learning, because you don't have enough data about your input, and the only option that you have to form clusters. Categories are formed only when you know that your data is two type of. Your input data is labeled and it's of two types, so it will be classification problem but when clustering problems happens, and you don't have much information about your input all you have to do is have to find patterns and you have to understand that data points which are similar are clustered into one group and data points which are different from the first group are clustered into another group. That is clustering. An example is Netflix, Netflix clusters their users into similar groups based on their interest, based on their age, geography and so on. This can be done by using unsupervised learning algorithms like K - means.

a. **Unsupervised Learning**
b. **Assigns data points and clusters**
c. **Main Aim is to group similar items clusters**
d. **Example - Find all transactions which are fraudulent in nature.**
e. **Algorithm k mean**
f. **Problem Statement**

LXXVII. REINFORCEMENT LEARNING:



Reinforcement Learning

Reinforcement Learning is a part of Machine learning where an agent is put in an environment and he learns to behave in this environment by performing certain actions and observing the rewards which it gets from those actions.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

AN RL AGENT LEARNS FROM THE CONSEQUENCES OF ITS ACTION, RATHER THAN FROM BEING TAUGHT EXPLICITLY. IT SELECTS ITS ACTION ON BASIS OF ITS PAST EXPERIENCES (EXPLOITATION) AND ALSO BY NEW CHOICES (EXPLORATION)

	Supervised Learning	Unsupervised Learning	Reinforcement Learning
Definition	The machine learns by using labelled data	The machine is trained on unlabelled data without any guidance	An agent interacts with its environment by producing actions & discovers errors or rewards
Type of problems	Regression & Classification	Association & Clustering	Reward based
Type of data	Labelled data	Unlabelled data	No pre-defined data
Training	External supervision	No supervision	No supervision
Approach	Map labelled input to known output	Understand patterns and discover output	Follow trail and error method
Popular algorithms	Linear regression, Logistic regression, Support Vector Machine, KNN, etc	K-means, C-means, etc	Q-Learning, SARSA, etc

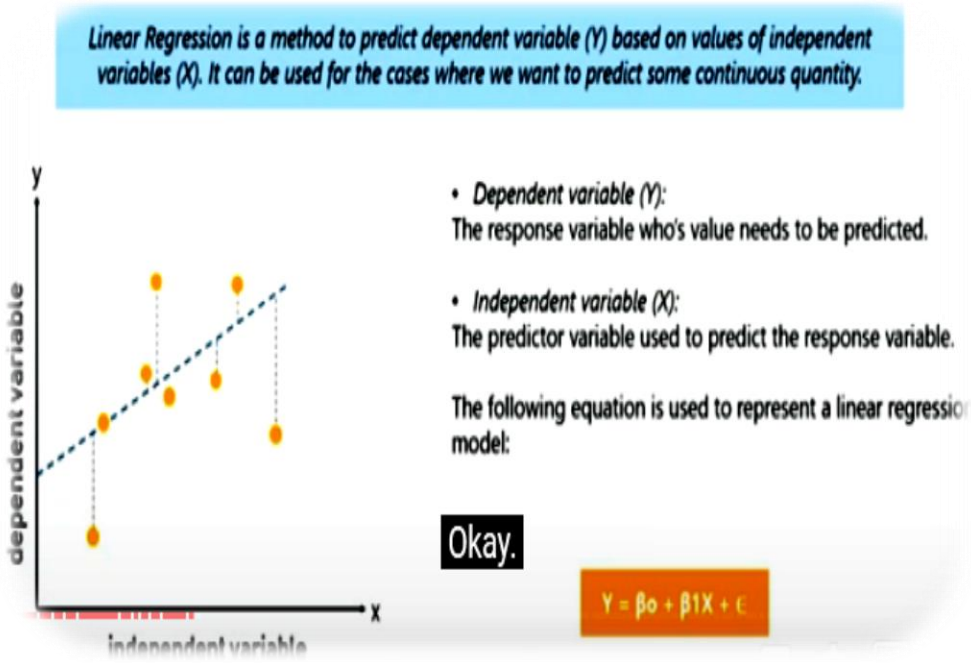
Supervised vs Unsupervised vs Reinforcement Learning

LXXVIII. AI ALGORITHMS

1 LINEAR REGRESSION

Linear Regression is basically supervised learning algorithm that is used to predict a continuous dependant variable y based on the values of independent variable x. The important thing is to note here that the dependent variable y, the variable that you are trying to predict, is always going to be a continuous variable. But the independent variable x, which is basically the predictor variables, these are the variables that will be using to predict your output variable which is nothing but your dependant variable. So your independent variables or your predictor variables can either be continuous or discreet. There is not such a restriction over here.

Can be either continuous variable or they can be discreet variables.



CONTINUOUS VARIABLE – It is a variable that has infinite number of possibilities. For Ex – Person weight, it can be 160 pound, 161 pounds, or 160.1134 pounds and so on. So the number of possibilities for weight is limitless, and this is exactly what continuous variable is.

In order to understand LINEAR REGRESSION is

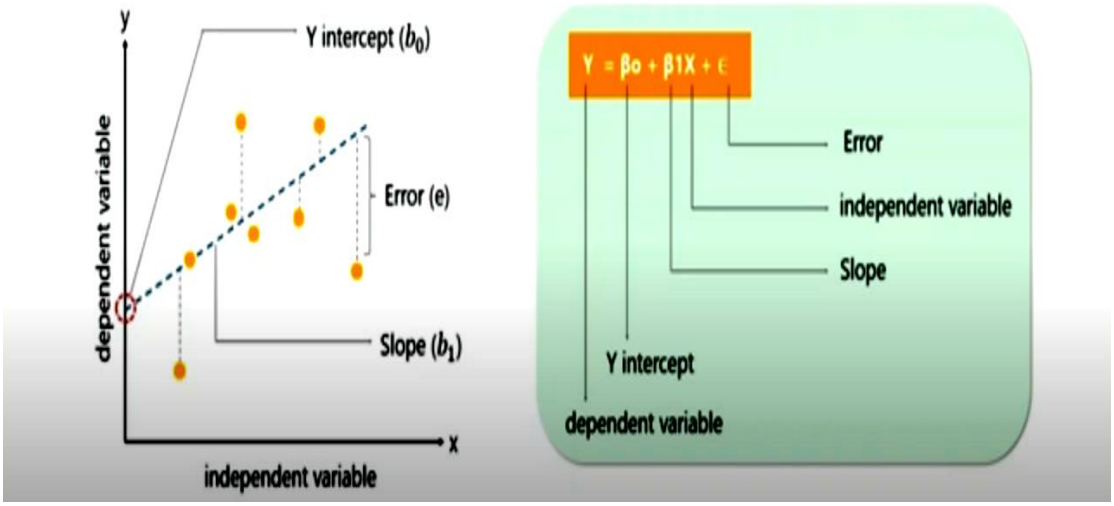
Let's assume that you want to predict the price of stock over a period of time. For such a problem you can make use of Linear Regression by studying the relationship between the dependant variable which is the stock price and independent variable, which is the time. So basically you are going to check how the price of a stock, you are trying to predict stock price over a period of time. You are trying to predict the stock price over a period of time. So basically, you are going to check how the price of stock varies over a period of time. So your stock price is going to be your dependant variable or your output variable, and the time is going to be your predictor or your independent variable. Your dependant variable is your output or your predictor variable. So, in our case, the stock price is obviously a continuous quantity, because the stock price can have an infinite number of values.

Now, the first step in Linear Regression is always to draw out your relationship between your dependant and your independent variable by using the best fitting linear length. We make an assumption that your dependant and independent variable is linearly related to each other. We call it Linear Regression because both the

variables vary linearly, which means plotting the relationship between these two variables; we'll get more of a straight line, instead of a curve.

Let's discuss the math behind linear regression.

Equation in yellow shade



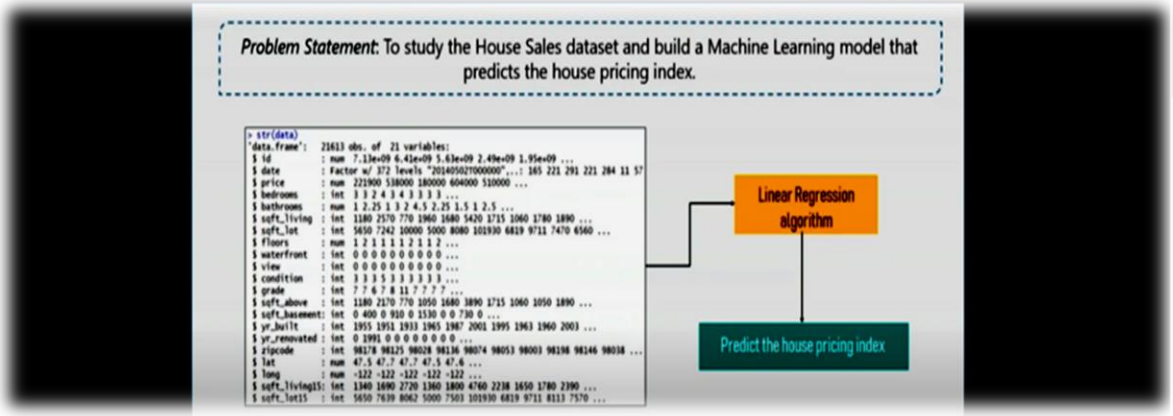
In above picture, Equation denotes the relationship between your independent variable x, which is here, and your dependant variable y. This is the equation we are trying to predict; we all know that the equation for a linear line in math is y equals mx plus c. So the equation for a linear line in math is y equals to mx plus c. Similarly, the linear regression equation is represented along the same line. Y equals to mx plus c. There is just a little bit of changes, but first understand this equation properly. So y basically stands for your dependant variable that you are going to predict B naught is the y intercept. Now y intercept is nothing but this point here.

Now in this graph, basically showing the relationship between your dependant variable y and your independent variable x, this is the linear relationship between these two variables. Now your y intercept is basically the point on the line which touches the y axis. This is y interceptor which is represented by B naught. Now B one or beta is the slope of this line now the slope can either be negative or positive, depending on the relationship between the dependent and independent variable. The next variable that we have is x. x here represents the independent variable that is used to predict our resulting output variable. Basically, x is used to predict the value of y. E here denotes the error in the computation. For Ex - This is actual line, and these dots here represent the predicted values. Now the distance between these two is denoted by the error in the computation.

So this is the entire equation.

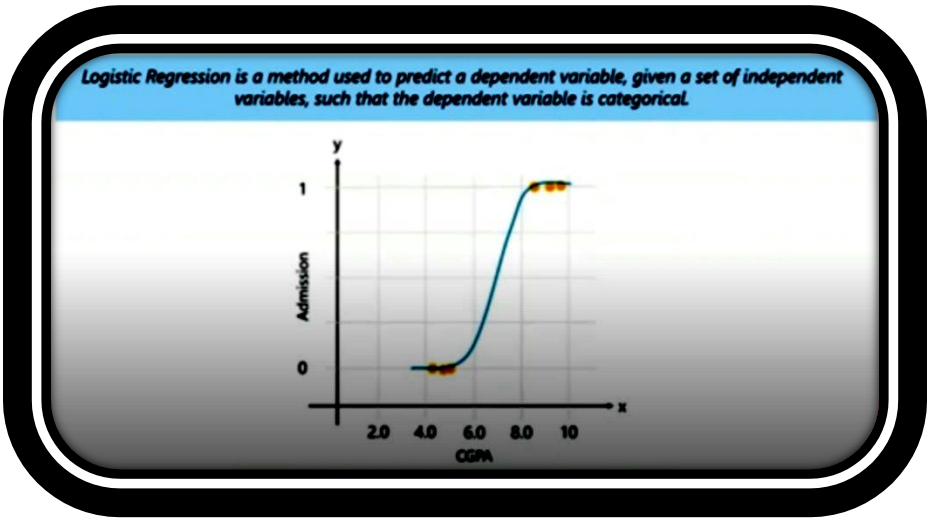
Linear Regression will basically draw a relationship between your input and your input variable.

Problem Statement: To study the House Sales dataset and build a MACHINE LEARNING model that predicts the house pricing index.



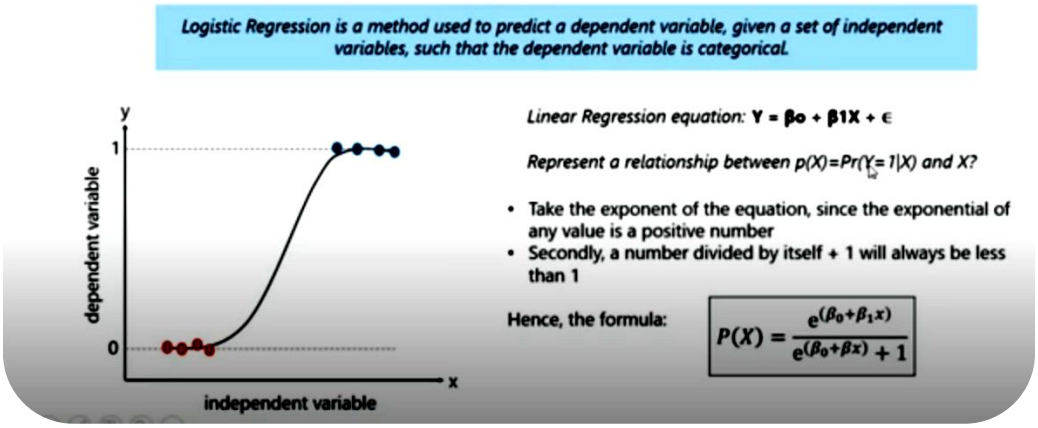
To solve this first we need to understand what the target variable is, what are the possible predictor variable that you will need. The first thing we should look at target variable. You should understand if this is a classification, regression or clustering problem look at your target variable or your output variable that you are supposed to predict.

2. LOGISTIC REGRESSION



e-ISSN: 2231-5152; p-ISSN: 2249-1796

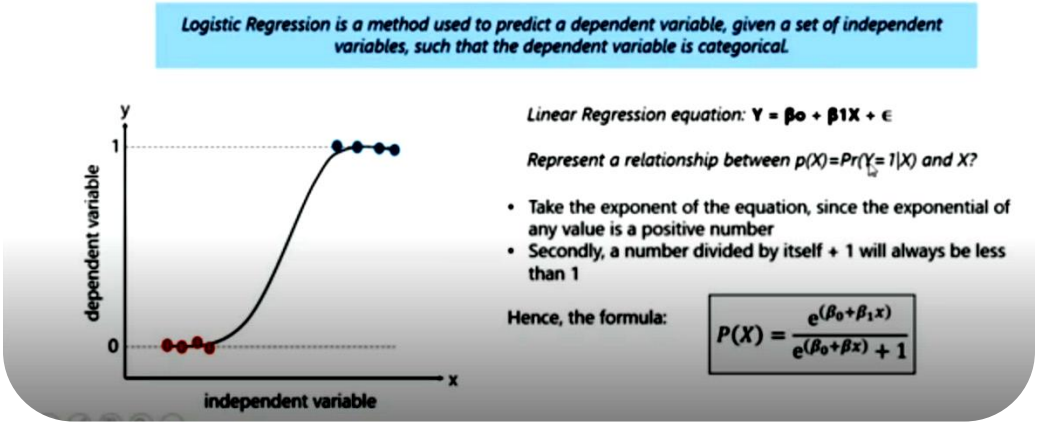
To understand logistic regression, let's consider small scenarios. Let's say your little sister is trying to get into grad school and you want to predict whether she will get admitted in her dream school or not. Based on her CGPA and the past data, you can use logistic data to foresee the outcome. So logistic regression will allow you to analyze the set of variables and predict a categorical outcome. Since here we need to predict whether she will get into a school or not, which is a classification problem, logistic regression will be used. So when the result in outcome can take only classes of values, like two classes of values, it is sensible to have a model that predicts the value as either zero or one, or in a probability form that ranges between zero and one. Logistic Regression is used to predict categorical quantities.



How does it work?

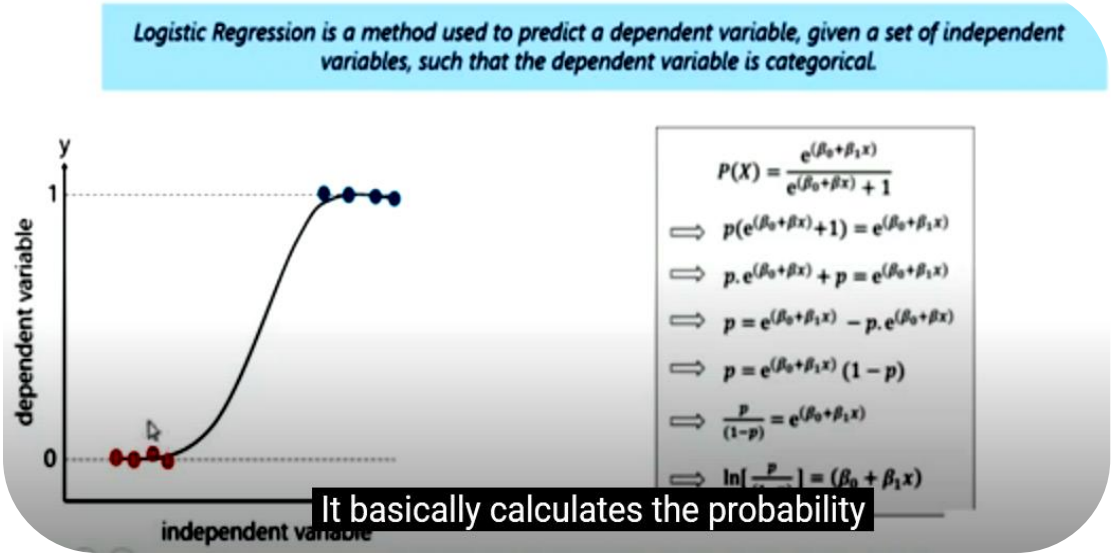
First understand the linear regression equation. This was the logistic regression equation. Outcome in a logistic regression is categorical. Categorical outcome will either be zero or one or it will be a probability that ranges between zero and one. So that's why we have this S curve. We have something known as sigmoid curve because we can have values ranging between zero and one, which will basically show the probability. So, maybe your output will be 0.7, which is a probability value if it is 0.7 it means that your outcome is basically one. So that's we have this sigmoid curve like this.

e-ISSN: 2231-5152; p-ISSN: 2249-1796



Linear Equation already discussed above. Y here stands for the dependent variable that needs to be predicted beta naught is nothing by the y intercept. Beta one is nothing but the slope and X here represents the independent variable that is used to predict y. That E denotes the error on the computation. So, given the fact that x is the independent variable and y is the dependent variable, how can we represent a relationship between x and y so that y ranges only between zero and one? Here this value basically denotes probability of y equal to one, given some value of x. So here, basically Pr, denotes probability and this value basically denotes that the probability of y equal to one, given some value of x, this is what we need to find out. If you wanted to calculate the probability using the linear regression model, then the probability will look something like P of X equal to beta naught plus beta one into X. P of X will be equal to beta naught plus beta one into X, where P of X nothing but your probability of getting y equal to one, given some value of x. so the logistic regression derived from the same equation, except we need to make a few alterations, because the output is only categorical. So, logistic regression does not necessarily calculate the outcome as zero or one. Instead, it calculates the probability of a variable falling in the class zero or class one. So that's how we can conclude that the resulting variable must be positive, and it should lie between zero and one, which means that it must be less than one so to meet these conditions, we have to do two things First, we can take the exponent of the equation, because taking an exponential of any value will make sure that you get a positive number. Secondly we have to make sure that your output is less than one. So, a number divided by itself plus one will always be less than one. So that's how we get this formula. First, we take the exponent of the equation, beta naught plus beta one plus x and then divide it by that number plus one. So this is how we get this formula.

e-ISSN: 2231-5152; p-ISSN: 2249-1796



Now the next step is to calculate something known as a logic function. Now the logic function is nothing, but it is a link function that is represented as an S curve or as a Sigmoid curve that ranges between the value zero and one. It basically calculates the probability of the output variable. So if you look at this equation, its quite simple. We just cross multiply and take each of our beta naught plus beta one into x as common. The RHS denotes the linear equation for the independent variables. The LHS represents the odd ratio. So if you compute this entire thing you will get this final value, which is basically your logistic regression equation. Your RHS here denotes the linear equation for independent variables, and your LHS represents the odd ratio which is also known as the logic function. Logic function is basically a function that represents an S curve that bring zero and one this will make sure that our value ranges between zero and one. So in logistic regression, on increasing this X by one measure, it changes the logic by a factor of beta naught. It is the same thing in logistic regression. Logistic regression is used for classification.

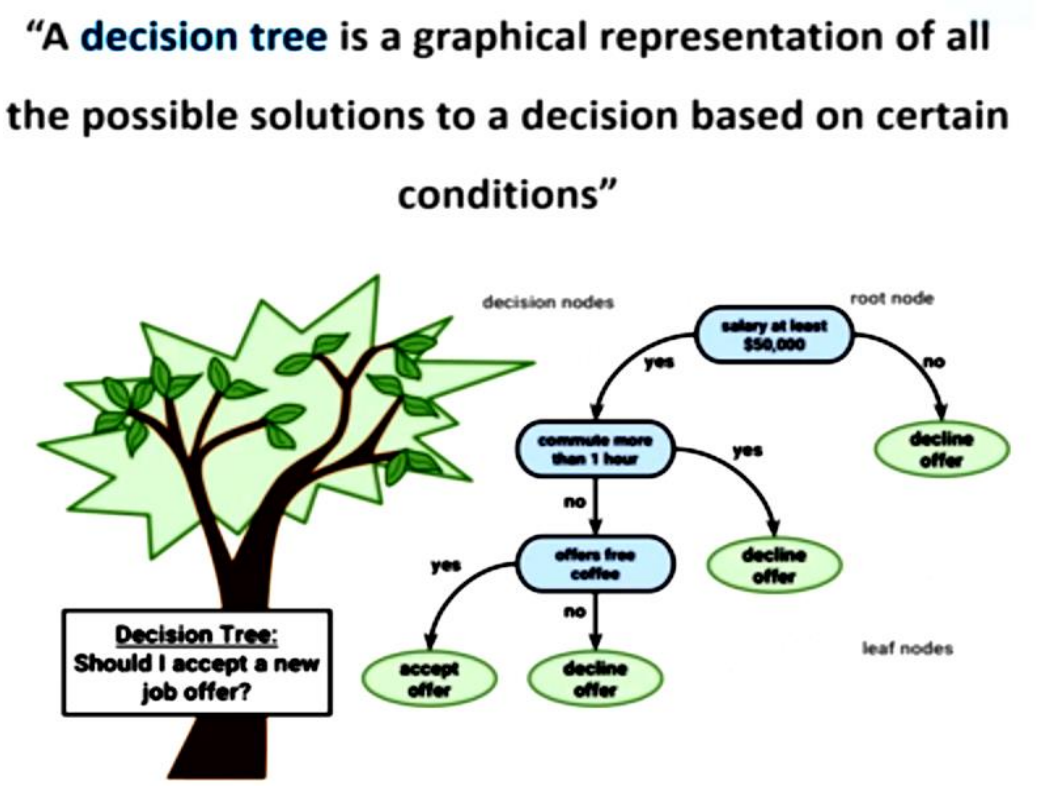
3. DECISION TREE

A decision Tree is a Supervised MACHINE LEARNING algorithm which looks like an inverted tree wherein each node represents a predictor variable (feature), the link between the nodes represents a Decision and each leaf node represents a Decision and each leaf node represents an outcome (response variable).

e-ISSN: 2231-5152; p-ISSN: 2249-1796

What is CLASSIFICATION?

"Classification is the process of dividing the datasets into different categories or groups by adding label".



Root Node: The root node is the starting point of a tree. At this point, the first split is performed.

Internal Nodes: Each internal node represents a decision point (predictor variable) that eventually leads to the prediction of the outcome.

Leaf/Terminal Nodes: Leaf nodes represents the final class of the outcome and therefore they are called terminating nodes.

Branches: Branches are connections between nodes, they are represented as arrows. Each branch represents a response such as yes or no.

International Journal of Advances in Engineering Research

e-ISSN: 2231-5152; p-ISSN: 2249-1796

ID3 ALGORITHM IS A CONCEPT BEHIND BUILDING A DECISION TREE

ID3 ALGORITHM HAS AROUND SIX DEFINED STEPS

STEP - 1 Select best Attribute (A).
STEP - 2 Assign A as a decision variable for the root Node.
STEP - 3 For each value of A, build a descendant of the node.
STEP - 4 Assign classification labels to the leaf node.
STEP - 5 If data is correctly classified stop.
STEP - 6 Else, iterate over the tree.

Best Attribute is the (best predictor variable) one that separates the data into different classes, most effectively, or it is basically a feature that splits the data set.
Now the question which variable best split the data?
To do this, there are two important measures. They are known as information gain and Entropy.
In order to understand information gain and entropy, We look at simple problem statement.

Example

Decision Tree

Parent Mail -

Tue, Feb 21, she replied,

Shut up Ekta and get a life...you have no business to contact me on my e mail id and phone...if you don't have better things to do in life go and do whatever you want with your friends but not on my e mail inbox plz..I have been patient enough..Don’t force me to take action against you...hope this was understood...n yes..I don't expect a response to this... Seems virtual was the only job that happened to you by fluke that you are not able to get over it till date...Unnecessarily sending messages and clogging inboxes..Your msgs to me go to my spam and are not even read...Hope that explains you how you are wasting your precious time which can be utilized in doing constructive things in life..dats why I say..go n get a better life..may you get wisdom to understand things and act appropriately..

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Child Mail

It signifies divine influx, and thence an elevation of the mind, and then manifest perception.

Here "shut up and get a life" signifies God qualifies who He is talking to and who has ultimate responsibility and accountability.

"When God shut up the heavens"

Blessings will be limited and command a period of judgment upon his people. When this happens, remember, tell the people, tell the generations to come the following words. We are for God. We are for His truth. We are the gospel of Jesus Christ. We are the power of God.

Here Gurgaon change into gurugram signifies that we are more known for our division than unity and more known for what we are against than what we are for. This division and disunity has resulted in much of the churches becoming spiritually impotent. The fire of God had fallen upon the Temple, resulting in the glory of god being so strong they couldn't even enter into it for worship.

When God shut up the heavens so that there is no rain, or command the locust to devour the land, or send pestilence among his people, if his people who are cared by his name humble themselves, and pray and seek his face and turn from their wicked ways then they will hear from heaven and will forgive their sin and heal their land.

She appeals to me for better life heaven will open for us if we "humble" – to lay low before God. The action of humbling ourselves is joined in Scripture with the practice of fasting and prayer. Fasting is abstinence from food with a spiritual goal in mind.

"Humble yourselves" – we are to take this action. We do so in many ways. GOD is never attracted to PRIDE, only to humility. You should do extraordinary prayer. "Extraordinary Prayer" is one of the marks of true spiritual revival and awakening. God is your first priority. Seek his face. Seeking him rather than wasting your precious time. Your sin is serious. God died for it. Your un confessed sin results in greater carnality. Your unrepentant heart leads to powerless spirituality. You have to take personal commitment to personal holiness.

That "a voice" is a message that 'Wake up! Make yourselves stronger before what little strength you have left is completely gone. I find that what you do is not good enough for my God. So don't forget what you have received and heard. Obey it. Change your hearts and lives! You must wake up, you need to pray, "Lord, bend me, bend me. " Lord, bend me away from pride, prayerlessness, personal priority and personal sin. "Lord, bend our temples and save us or I will come to you and surprise you like a thief. You will not know when I will come. "But you have a few people in your group there in Sardis who has kept themselves clean. They will walk with me. They will wear white clothes, because they are worthy. Everyone who wins the victory will be dressed in white clothes like them. I will not remove their names from the book of life. I will say that they belong to me before my Father and before his angels. Everyone who hears this should listen to what the Spirit says to the churches. '

(Revelation 3:2-6)

e-ISSN: 2231-5152; p-ISSN: 2249-1796

"**This is the most confidential part of the Vedic scriptures, O sinless one, and it is disclosed now by Me. Whoever understands this will become wise, and his endeavours will know perfection".**

In chapter 15, Soul & World are very beautifully described by Lord Krishna. Any act which is auspicious or otherwise, birth or death is recited and is considered very sacred.

A BIRD'S EYE VIEW

Verse 1-5 Gives a description of the inverse Ashvasth Tree (Banyan Tree) and through this description of the world is given as well the solution of getting out of the material world.

THE INVERTED BANYAN TREE

In the first verse, Krishna says that one who knows the "Ashvasth" tree (also a Quality), knows everything. Its roots are upwards while its branches are downwards (just like the reflection of a tree in a lake at sunset). "Mulam" or the reference is given to the roots which are Udharv or upwards while the branches are Adha or downwards. **The verse mentions that the tree has many leaves that are linked to the hymns of the Vedas. So verse 1 which refers –**

Adhyatmik /The Original Tree(Upwards)	Bhotik/The Reflected Tree(Reverse)
Is the Spiritual World	Is the Material World
Tripad Vibhuti(Free from forgetfulness & Contamination)	Akpad Vibhuti(Forgetfulness & Contamination)
Consciousness is the essence	Base/Material is the essence
Focused on love for Krishna	Focused on Sense gratification

e-ISSN: 2231-5152; p-ISSN: 2249-1796

The tree of this material world is only a reflection of the real tree of the spiritual world. This reflection of the spiritual world is situated on desire, just as the tree's reflection is situated on water. Desire is the cause of things being situated in this reflected material light.

One who wants to get out of this material existence must know this tree thoroughly through analytical study. Then he can cut off his relationship with it. The purpose of the *Vedas,* as disclosed by the Personality of Godhead Himself, is to cut down this reflected tree and attain the real tree of the spiritual world. The material reflection of the real tree has to be cut off. When it is said that a person knows the *Vedas,* it is assumed that he knows how to cut off attachment to this material world.

IN THE REVERSE TREE the roots are **Krishna** (He is holding the entire Universe), the trunk is Brahma while the branches and twigs are the Sarvalok, Bhuvalok and Bhulok(the three planetary system). Even Swarg lok(heaven) does not take us to Krishna as it is part of the branches where we get lost, similarly the leaves are the attractive vedic verses where again we can get lost but do not reach Krishna. So, we have to reach Krishna directly(the roots) to break the cycle of birth and death. In BHAGAVAD GITA 15.15 Krishna says do not be stuck in the leaves go to the roots. We are supposed to put water or our services to the roots and not be attracted to the world. Further Krishna says, "One who knows this knows everything"

The branches of this tree extend downward and upward, nourished by the three modes of material nature. The twigs are the objects of the senses. This tree also has roots going down, and these are bound to the fruitive actions of human society.

In the Bhagvat Gita Krishna mentions in 7.6 that, "I am the originator and destroyer of all" in BHAGAVAD GITA 10.8 Krishna says , "I am the source of the entire universe" while in BHAGAVAD GITA 14.4 Krishna says "I am the seed father from which all comes". So the essence is Krishna. In BHAGAVAD GITA 10.26, Krishna says I am the Ashvastha tree. One who is in KRISHNA consciousness, who is engaged in devotional service, already knows the Vedas.

The entanglement of this material world is compared here to a banyan tree. For one who is engaged in fruitive activities, there is no end to the banyan tree. for one who is attached to this tree, there is no possibility of liberation. If one can understand this indestructible tree of illusion, then one can get out of it. Devotional service to the Supreme Lord is the best way to get out of the material entanglement. Now, the **basic principle of devotional service is detachment from material activities** and attachment to the transcendental service of the Lord.

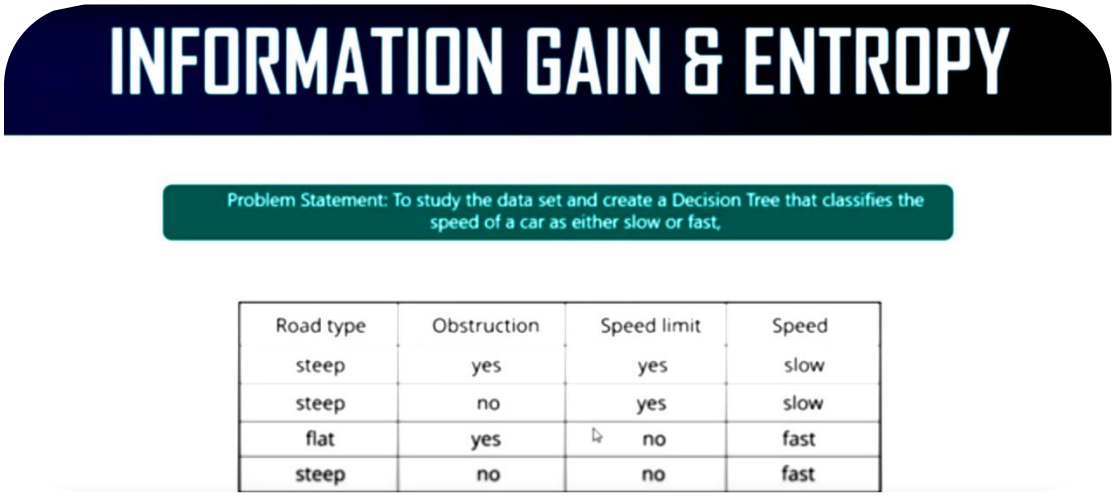
"The root of this material existence grows upward. This means that it begins from the total material substance, from the topmost planet of the universe. From there, the whole universe is expanded, with so many branches, representing the various planetary systems. The fruits represent the results of the living entities' activities, namely, religion, economic development, sense gratification and liberation."

To get out of the entanglement of this strong banyan tree of material life, one must surrender to KRISHNA.

While performing devotional service in the association of pure devotees in full KRISHNA consciousness, there are certain things which require to be vanquished altogether. The most important thing one has to surmount is weakness of the heart. The first fall down is caused by the desire to lord it over material nature. Thus one gives up the transcendental loving service of the Supreme Lord. The second weakness of the heart is that as one increases the propensity of lording it over material nature.

A BLEND OF ENERGIES AND ATTRIBUTES OF WORDS AND VIBRATIONS ASKS YOU TO BELIEVE IN GOD. HAVE FAITH AND TRUST.

LXXIX. INFORMATION GAIN & ENTROPY



e-ISSN: 2231-5152; p-ISSN: 2249-1796

This data represents the speed of a car based on certain parameters. So our problem statement here is to study the data set and create a decision tree that classifies the speed of the car as either slow or fast. So our predictor variables here are road type, obstruction, and speed limit, and or response variable, or our output variable is speed. So we'll be building a decision tree using these variables in order to predict the speed of car. We must first begin by deciding a variable that best splits the data set and assign that particular variable to the root node and repeat the same thing for other nodes as well.

Step – 1 Select Best Attribute (A)

Q – How do you know which variable best separates the data?

Answer – The variable with the highest information Gain best divides the data into the desired output classes.

Calculate the following measures:

a. **Entropy**
b. **Information Gain**

✓ **Entropy is basically used to measure the impurity or the uncertainty present in the data. It is used to decide how a decision tree can split the data.**

✓ **Information gain is the most significant measure which is used to build a decision tree; it indicates how much "information" a particular feature/variable gives us about the final outcome. So information gain is important, because it is used to choose a variable that best splits the data at each node for a decision tree. Now the variable with the highest information gain will be used to split the data at the root node.**

Calculating IG of parent node (Speed of car)

Find out the fraction of the two classes (slow & fast) present in the parent node:

- P(slow) -> fraction of 'slow' outcomes in the parent node
- P(fast) -> fraction of 'fast' outcomes in the parent node

The formula to calculate P(slow) is:

p(slow) = no. of 'slow' outcomes in the parent node / total number of outcomes

Road type	Obstruction	Speed limit	Speed
steep	yes	yes	slow
steep	no	yes	slow
flat	yes	no	fast
steep	no	no	fast

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Now in our data set, there are four observations. We will start by calculating the entropy and information gain for each of the predictor variable.

By calculating the information gain and entropy for road type variable, in our data set, we can see there are four observations. There are four observations in the road type column, which corresponds to the four labels in the speed column. So we are going begin by calculating the information gain of the parent node. The parent node is nothing but the speed of the car node. This is our output variable. It will be used to show whether the speed of the car is slow or fast. So to find out the information gain of the speed of the car variable, we will go through a couple of steps. Now we know that there are four observations in this parent node. First, we have slow. Then again we have slow, fast, and fast. Now, out of these four observations, we have two classes. So two observations belong to the class slow, and two observations belong to the class fast. So that's how you calculate P slow and P fast. P slow is nothing by the fraction of slow outcomes in the parent node, and P fast is the fraction of fast outcomes in the parent node. And the formula to calculate P slow is the number of slow outcomes in the parent node divided by the total number of outcomes.

Calculating IG of parent node (Speed of car)

Similarly for p(fast),

p(fast) = no. of 'fast' outcomes in the parent node / total number of outcomes

$$P_{fast} = \frac{2}{4} = 0.5$$

Road type	Obstruction	Speed limit	Speed
steep	yes	yes	slow
steep	no	yes	slow
flat	yes	no	fast
steep	no	no	fast

Therefore, the entropy of the parent node is:

$$Entropy_{parent} = -\Sigma p_{slow} log_2(p_{slow}) + p_{fast} log_2(p_{fast})$$

Entropy(parent) = – (0.5 log2(0.5) + 0.5 log2(0.5)) = – (-0.5 + (-0.5)) = 1

So the number of slow outcomes in the parent node is two, and the total number of outcomes is four. We have four observations in total. So that's how we get P of slow as 0.5

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Calculating IG of parent node (Speed of car)

Similarly for p(fast),

p(fast) = no. of 'fast' outcomes in the parent node / total number of outcomes

$$P_{fast} = \frac{2}{4} = 0.5$$

Road type	Obstruction	Speed limit	Speed
steep	yes	yes	slow
steep	no	yes	slow
flat	yes	no	fast
steep	no	no	fast

Therefore, the entropy of the parent node is:

$$Entropy_{parent} = -\Sigma p_{slow} log_2(p_{slow}) + p_{fast} log_2(p_{fast})$$

Entropy(parent) = – (0.5 log2(0.5) + 0.5 log2(0.5)) = – (-0.5 + (-0.5)) = 1

Similarly, for P of fast, you will calculate the number of fast outcomes divided by the total number of outcomes. So again, two by four, you will get 0.5. The next thing you will do is you will calculate the entropy of this node. So to calculate the entropy, this is the formula. All we have to do is we have to substitute the, value in this formula. So P of slow we are sibstituting as 0.5. Similarly, P of fast as 0.5. Now when you substitute the value, you will get a answer of one. So the entropy of your parent node is one. So after calculating the entropy of the parent node,

Calculating IG of child node (Road Type)

Entropy of right side child node (fast):

Entropy of left side child node (slow, slow, fast):

P(slow) = 2/3 = 0.667
P(fast) = 1/3 = 0.334

Therefore, the entropy is:

Entropy(left child node) = – (0.667 log2(0.667) + 0.334 log2(0.334))
= – (-0.38 + (-0.52)) = 0.9

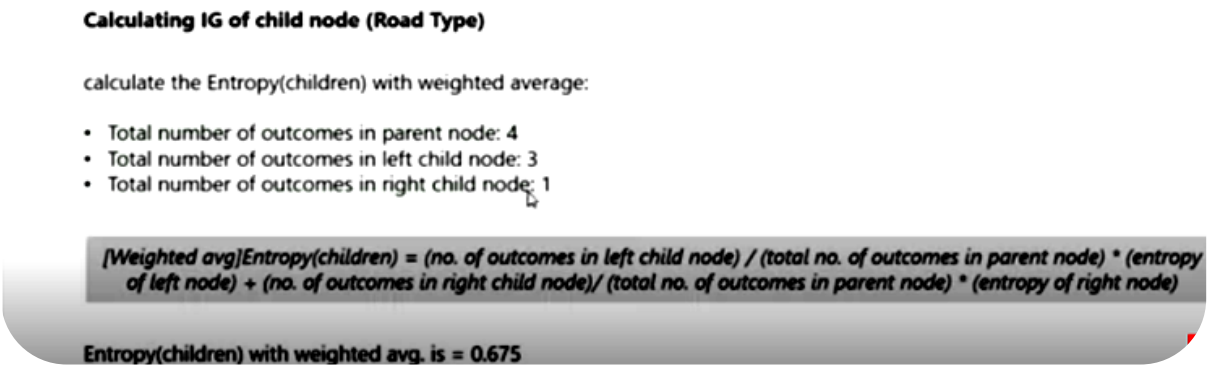
We will calculate the information gain of the child node, if the information gain of the road type of variable is greater than the information gain of all the other predictor variables, only then the root node can be split by using the road type variable. So, to calculate the information gain of road type variable, we first need to split the root node by sing the road type variable. We are just doing this in order to check if the road type variable is giving us maximum about a data.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

We can notice that road type has two outcomes; it has two values, either steep or flat. In our data set we have noticed whenever the road type is steep, so first what we will do is we will check the value of speed that we get when the road type is steep. So, first, observation, we see that whenever the road type is steep, we are getting a speed of slow. Similarly, in the second observation, when the road type is steep, you will get a value of slow again. If the road type is flat, you will get an observation of fast. And again, if it is a steep, there is a value of fast. So for three steep values, we have slow, slow, and fast. And when the road type is flat, we will get an output of fast. That's exactly what I have done in this decision tree. So whenever the road type is steep, you will get slow, slow or fast. And whenever the road type is flat, you will get fast. Now the entropy of the right – hand side is zero. Entropy is nothing but the uncertainty. There is no uncertainty over here. Because as soon as soon as you see that the road type is flat, your output is fast. So there is no uncertainty. But when the road type is steep, you can have any one of the following outcomes, either your speed will be slow or it can be fast. So you will start by calculating the entropy of both RHS and LHS of the decision tree. So the entropy for the right side child node will be zero, because there is no uncertainty here. Immediately, if you see that the road type is flat, your speed of the car will be fast. So there is no uncertainty here, and therefore your entropy becomes zero. Now entropy for the left – hand side is we will again have to calculate the fraction of P slow the fraction of P fast. S out of three observations, in two observations we have slow. That is why we have two by three over here. Similarly for P fast, we have one P fast divided by the total number of observation which are three. So out of these three, we have two slows and one fast. When you calculate P slow and P fast, you will get these two values. And then when you substitute the entropy in this formula, you will get the entropy as 0.9 for the road type variable. So, basically here we are calculating the information gain and entropy for road type variable. Whenever you consider road type variable, there are two values, steep and flat. And whenever the value for road type is steep, you will get anyone of these three outcomes, either you will get slow, slow, or fast. And when the road type is flat your outcomes will be fast. Now because there is no uncertainty whenever the road type is flat, you will always get an outcome of fast. This means that the entropy here is zero, or the uncertainty value here is zero. But here, there is a lot of uncertainty. So whenever your road type is steep, your output can either be slow or it can be fast. So, finally, you get the Python as 0.9. So in order to calculate the information gain of the road type variable we need to calculate the weighted average.

In order to calculate the information gain, you need to know the entropy of the parent, which we calculate as one, minus the weighted average into the entropy of the children. So for this formula, you need to calculate all of these values. So, first of all, you need to calculate the entropy of the weighted average. Now the total number of outcomes in the parent node we saw was four. The total number of outcomes in the left child node was three. And the total number of outcomes in the right child node was one. In order to verify with you the total number of outcomes in the parent node are four. One, two, three, and four.

e-ISSN: 2231-5152; p-ISSN: 2249-1796



Coming to the child node, which is the road type, the total number of outcomes on the right – hand side of the child node is one. And the total number of outcomes on the left – hand side of the child – node is three. After that you have to substitute these values in this formula. When you do that you will get the entropy of the children with weighted average will be around 0.675.

Now just substitute the value in this formula. So if you calculate the information gAIn of the road type variable, you will get a value of 0.325. Now by using the same method, you are going to calculate the information gain for each of the predictor variable, for road type, for obstruction, and for speed limit. Now when you follow the same method and you calculate the information gain, you will get these values. Now what does this information gain for road type equal to 0.325 denote? Now the value 0.325 for road type denotes that we are getting very little information gain from this road type variable. And for obstruction, we literally have information gain of zero. Similarly, information gained for speed limit is one. This is the highest value we have got for information gain. This means that we will have to use the speed limit variable at our root node in order to split the data set.

Calculating IG of child node (Road Type)

Information Gain = entropy(parent) - (weighted average) * entropy(children)

Calculating IG of child node (Road Type)

Information Gain = entropy(parent) – [weighted average] * entropy(children)

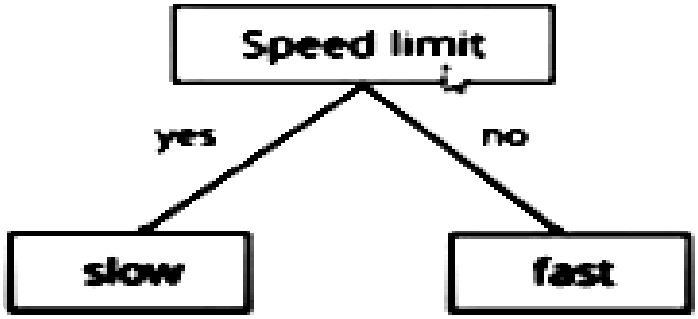
Therefore,

Information gain(Road type) = 1 – 0.675 = 0.325

So by using the above methodology, you must get the following values for each predictor variable:

- **Information gain(Road type) = 1 – 0.675 = 0.325**
- **Information gain(Obstruction) = 1 – 1 = 0**
- **Information gain(Speed limit) = 1 – 0 = 1**

Whichever variable gives you the maximum information gain that variable has to be chosen at the root node. So that is why we have the root node as speed limit.



So if you maintained the speed limit then you are going to go slow. But if you have not maintained the speed limit, then the speed of car is going to be fast. Your entropy is literally zero. And your information gain is one, meaning that you can use this variable at your root node in order to split the data set, because speed limit gives you the maximum information gain.

To summarize problem statement in order to create a decision tree that classifies the speed of a car as either slow or fast. You were given three predictor variables and this was your output variable. Information gained in entropy are basically two measures that are used to decide which variable will be assigned to the root node of a decision tree. As soon as you look at the data set, if you compare these two columns named speed limit and speed, you will get an output easily.

Meaning that if you are maintaining speed limit, you are going to go slow but if you are not maintaining speed limit, you are going to a fast. So here itself we can understand the speed limit has no uncertainty. So every time you have maintained your speed limit, you will be going slow, and every time your outside or speed limit, you will be going fast. So you started by calculating the entropy of the parent node. You calculated the entropy of

the parent node, which came down to one. After that, you calculated the information gain of each of the child nodes. In order to calculate the information gain of the child node, you start by calculating the entropy of the right – hand side and the left – hand side of the decision tree. Then you calculate the entropy along with the weighted average. You substitute these values in the information gain formula, and you get the information gAIn for each of the predictor variables. So after you get the information gain of each of the predictor variables, you check which variables gives you the maximum information gain, and you assign that variable to your root node.

4. NAÏVE BAYES

NAÏVE BAYES CLASSIFIER ALGORITHM

- Naïve Bayes algorithm is a supervised learning algorithm, which is based on **Bayes theorem** and used for solving classification problems.
- It is mAInly used in *text classification* that includes a high-dimensional training dataset.
- Naïve Bayes Classifier is one of the simple and most effective Classification algorithms which helps in building the fast MACHINE LEARNING models that can make quick predictions.
- **It is a probabilistic classifier, which means it predicts on the basis of the probability of an object**.
- Some popular examples of Naïve Bayes Algorithm are **spam filtration, Sentimental analysis, and classifying articles**.

Why is it called Naïve Bayes?

The Naïve Bayes algorithm is comprised of two words Naïve and Bayes, Which can be described as:

- **Naïve**: It is called Naïve because it assumes that the occurrence of a certain feature is independent of the occurrence of other features. Such as if the fruit is identified on the bases of color, shape, and taste, then red, spherical, and sweet fruit is recognized as an apple. Hence each feature individually contributes to identify that it is an apple without depending on each other.
- **Bayes**: It is called Bayes because it depends on the principle of Bayes' Theorem.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

LXXX. BAYES' THEOREM

- Bayes' theorem is also known as **Bayes' Rule** or **Bayes' law**, which is used to determine the probability of a hypothesis with prior knowledge. It depends on the conditional probability.
- The formula for Bayes' theorem is given as:

$$P(A|B)= \frac{P(B|A)P(A)}{P(B)}$$

Where,

P(A|B) is Posterior probability: Probability of hypothesis A on the observed event B.

P(B|A) is Likelihood probability: Probability of the evidence given that the probability of a hypothesis is true.

P(A) is Prior Probability: Probability of hypothesis before observing the evidence.

P(B) is Marginal Probability: Probability of Evidence.

Working of Naïve Bayes' Classifier:

Working of Naïve Bayes' Classifier can be understood with the help of the below example:

Suppose we have a dataset of **weather conditions** and corresponding target variable "**Play**". So using this dataset we need to decide that whether we should play or not on a particular day according to the weather conditions. So to solve this problem, we need to follow the below steps:

1. Convert the given dataset into frequency tables.
2. Generate Likelihood table by finding the probabilities of given features.
3. Now, use Bayes theorem to calculate the posterior probability.

Problem: If the weather is sunny, then the Player should play or not?

Solution: To solve this, first consider the below dataset:

	Outlook	Play
0	Rainy	Yes
1	Sunny	Yes
2	Overcast	Yes
3	Overcast	Yes
4	Sunny	No
5	Rainy	Yes
6	Sunny	Yes
7	Overcast	Yes
8	Rainy	No
9	Sunny	No
10	Sunny	Yes
11	Rainy	No
12	Overcast	Yes
13	Overcast	Yes

Frequency table for the Weather Conditions:

Weather	Yes	No
Overcast	5	0
Rainy	2	2
Sunny	3	2
Total	10	5

Likelihood table weather condition:

Weather	No	Yes	
Overcast	0	5	5/14= 0.35
RAIny	2	2	4/14=0.29
Sunny	2	3	5/14=0.35
All	4/14=0.29	10/14=0.71	

Applying Bayes'theorem:

P(Yes|Sunny)= P(Sunny|Yes)*P(Yes)/P(Sunny)

P(Sunny|Yes)= 3/10= 0.3

P(Sunny)= 0.35

P(Yes)=0.71

So P(Yes|Sunny) = 0.3*0.71/0.35= **0.60**

P(No|Sunny)= P(Sunny|No)*P(No)/P(Sunny)

P(Sunny|NO)= 2/4=0.5

P(No)= 0.29

P(Sunny)= 0.35

So P(No|Sunny)= 0.5*0.29/0.35 = **0.41**

So as we can see from the above calculation that **P(Yes|Sunny)>P(No|Sunny)**

Hence on a Sunny day, Player can play the game.

APPLICATIONS OF NAÏVE BAYES CLASSIFIER

- It is used for **Credit Scoring**.
- It is used in **medical data classification**.
- It can be used in **real-time predictions** because Naïve Bayes Classifier is an eager learner.
- It is used in Text classification such as **Spam filtering** and **Sentiment analysis**.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

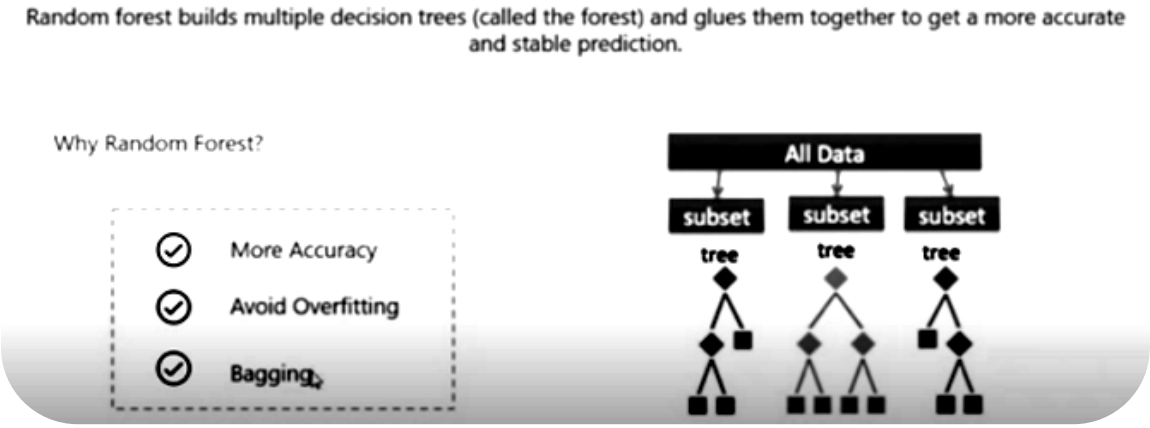
TYPES OF NAÏVE BAYES MODEL

There are three types of Naive Bayes Model, which are given below:

- **Gaussian: The Gaussian model assumes that features follow a normal distribution. This means if predictors take continuous values instead of discrete, then the model assumes that these values are sampled from the Gaussian distribution.**
- **Multinomial**: The Multinomial Naïve Bayes classifier is used when the data is multinomial distributed. It is primarily used for document classification problems; it means a particular document belongs to which category such as Sports, Politics, education, etc.
The classifier uses the frequency of words for the predictors.
- **Bernoulli**: The Bernoulli classifier works similar to the Multinomial classifier, but the predictor variables are the independent Booleans variables. Such as if a particular word is present or not in a document. This model is also famous for document classification tasks.
-

LXXXI. WHAT IS RANDOM FOREST?

Random forest basically builds multiple decision trees and glues them together to get a more accurate and stable prediction. Random Forest is a collection of decision trees.

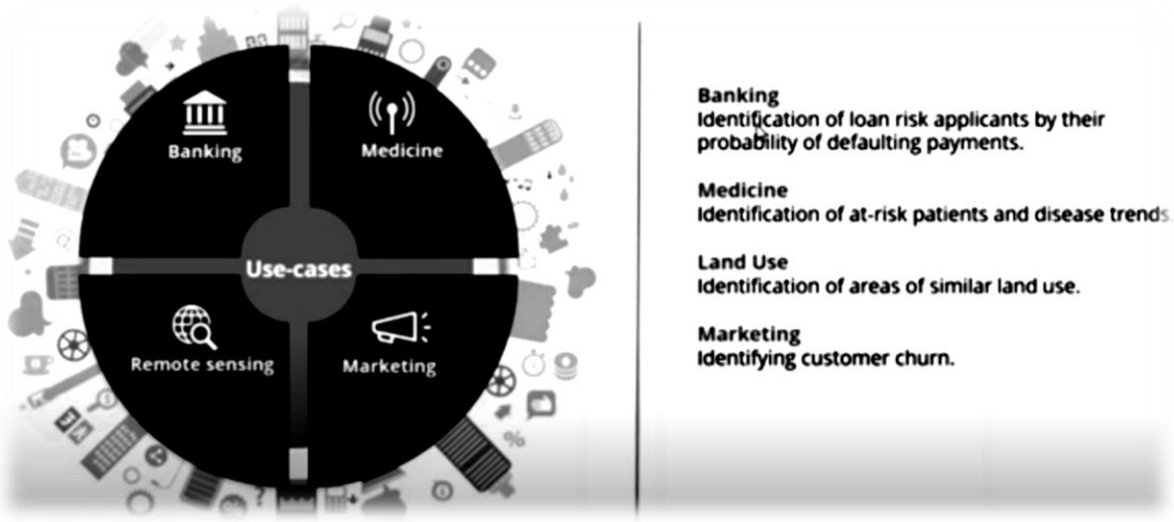


Why it is used?

In Random Forest there is something known as bagging is to reduce the variations and the predictions by combining the result of multiple decision trees on different sample of the data set so your data set will be divided into different samples, and you will be building a decision trees on each of these samples. This

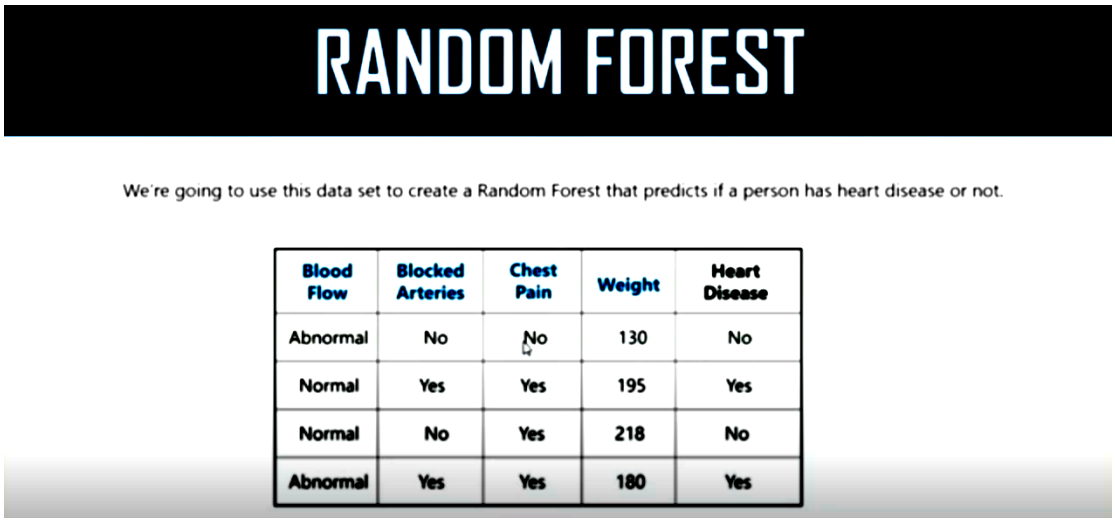
way, each decision tree will be studying one subset of your data so this way over fitting will get reduced because one decision tree is not studying the entire data set.

Use cases



HOW RANDOM FOREST WORK

We can predict by DATA SET if a person has heart disease or not.



Blood Flow	Blocked Arteries	Chest Pain	Weight	Heart Disease
Abnormal	No	No	130	No
Normal	Yes	Yes	195	Yes
Normal	No	Yes	218	No
Abnormal	Yes	Yes	180	Yes

e-ISSN: 2231-5152; p-ISSN: 2249-1796

First step in creating Random Forest that you create bootstrap data set. Bootstrapping is estimation method used to make predictions on a data set by re – sampling it. In bootstrapping you have to do you have to randomly select samples from your original data set. You can select the same sample more than once.

Step 1 Create a Bootstrapped Dataset

Step 2 Creating Decision Trees

a) **Build a Decision Trees by using the bootstrapped data set.**
b) **Begin at the root node and choose the best attribute to split the data set**
c) **Repeat the same process for each of the upcoming branch nodes.**

Step 3 Go back to step 1 and repeat

a) **Each Decision Tree predicts the output class based on the respective predictor variables used in that tree.**
b) **Go back to step 1 and create a new bootstrapped data set and build a decision tree by considering only a subset of variables at each step.**
c) **This iteration is performed 100's of times, creating multiple decision trees.**

Step – 4 predicting the outcome of a new data point

- ✓ **To predict whether a new patient has heart disease or not, run the new data down the decision trees.**
- ✓ **After running the data down all the trees in the Random Forest, we check which class got the majority votes.**
- ✓ **In our case, the class 'Yes' received the most number of votes, hence it is clear that the new patient has heart disease.**

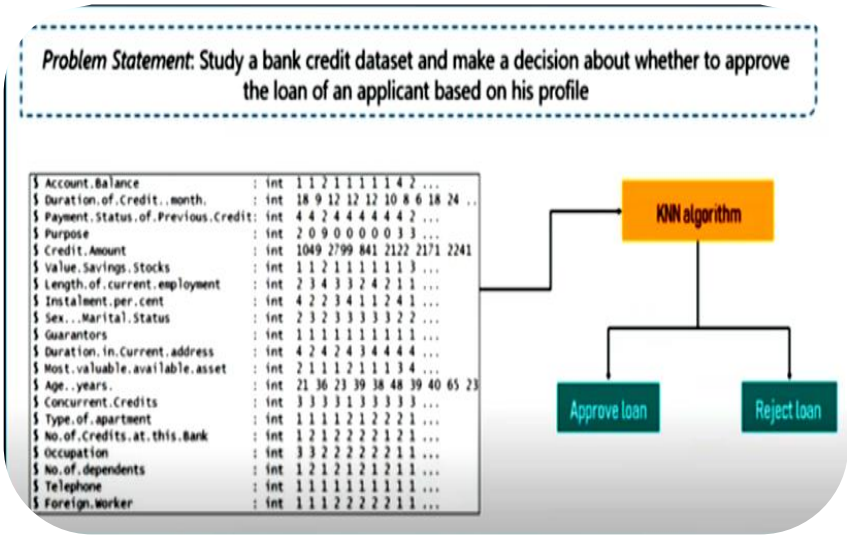
Step 5 - Evaluate the model

- ✓ **In a real - world problem, about 1/3rd of the original data set is not included in the bootstrapped data set.**
- ✓ **This sample data set that does not include in the bootstrapped data set is known as the Out - of Bag (OOB) data set.**
- ✓ **We can measure the accuracy of a Random Forest by the proportion of OOB samples that are correctly classified.**

Blood Flow	Blocked Arteries	Chest Pain	Weight	Heart Disease
Normal	No	Yes	218	No

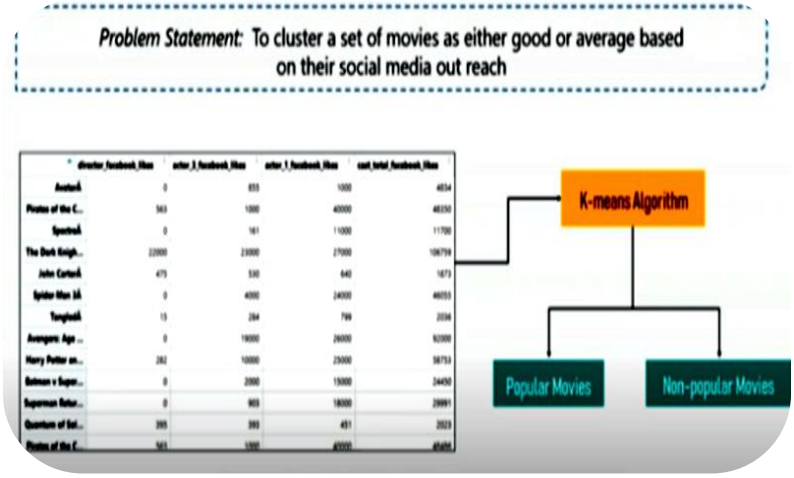
LXXXII. KNN (K NEAREST NEIGHBOR) ALGORITHM

Problem Statement: Study a bank credit dataset and make a decision about whether to approve the loan of an applicant based on his profile.



So, what is your output variable over here, output variable is to predict whether you can approve the loan of an applicant or not. So, obviously, your output is going to be categorical. It is either going to be yes or no. Yes is basically a approve loan and no is reject loan. So here we understand this is a classification problem. So you can make use of algorithms like KNN algorithm or you can make use of support vector machines in order to do this. Support vector machine and KNN which is K nearest neighbor algorithms is basically supervised learning algorithm

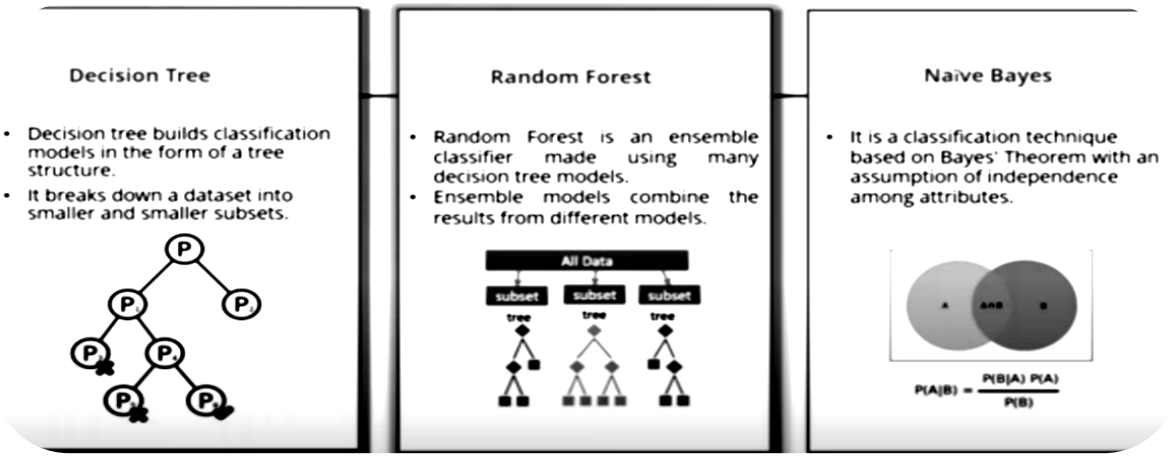
Problem Statement: To cluster a set of movies as either good or average based on their social media out reach



If you look properly your clue in the question itself, the first line it says is to cluster a set of movies as either good or average. It is obviously clustering problem, the K-means clustering algorithm, and you can form two clusters one will contain the popular movies and the other will contain non – popular movies. These all are examples how we can use MACHINE LEARNING to solve clustering problem, regression and classification problem.

LXXXIII. TYPES OF CLASSIFIERS

A. **DECISION TREE**
B. **RANDOM FOREST ALGORITHM**
C. **NAÏVE BAYE**



SupervisedLearning:

It is the learning where the value or result that we want to predict is within the trAIning data (labeled data) and the value which is in data that we want to study is known as Target or Dependent Variable or *Response Variable*.

All the other columns in the dataset are known as the Feature or Predictor Variable or Independent Variable.

Supervised Learning is classified into two categories:

1. **Clarification**: Here our target variable consists of the categories.
2. **Regression**: Here our target variable is continuous and we usually try to find out the line of the curve.

As we have understood that to carry out supervised learning we need labeled data. How we can get labeled data? There are various ways to get labeled data:

1. Historical labeled Data
2. Experiment to get data: We can perform experiments to generate labeled data like A/B Testing.
3. Crowd-sourcing

K-NEAREST NEIGHBOR ALGORITHM:

This algorithm is used to solve the classification model problems. K-nearest neighbor or K-NN algorithm basically creates an imaginary boundary to classify the data.

When new data points come in the algorithm will try to predict that to the nearest of the boundary line.

Therefore, larger k value means smother curves of separation resulting in less complex models.

Whereas, smaller k value tends to over fit the data and resulting in complex models.

Note: It's very important to have the right k-value when analyzing the dataset to avoid over fitting and under fitting of the dataset.
Using the k-nearest neighbor algorithm we fit the historical data (or trAIn the model) and predict the future.

EXAMPLE OF THE K-NEAREST NEIGHBOR ALGORITHM

```
filter_none

brightness_4
# Import necessary modules

from sklearn.neighbors import KNeighborsClassifier

from sklearn.model_selection import train_test_split

from sklearn.datasets import load_iris


# Loading data

irisData = load_iris()
```

```
# Create feature and target arrays
X = irisData.data
y = irisData.target

# Split into training and test set
X_train, X_test, y_train, y_test = train_test_split(
            X, y, test_size = 0.2, random_state=42)

knn = KNeighborsClassifier(n_neighbors=7)

knn.fit(X_train, y_train)

# Predict on dataset which model has not seen before
print(knn.predict(X_test))
```

In the example shown above following steps are performed:

1. The k-nearest neighbor algorithm is imported from the scikit-learn package.
2. Create feature and target variables.
3. Split data into trAIning and test data.
4. Generate a k-NN model using neighbors value.
5. TrAIn or fit the data into the model.
6. Predict the future.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

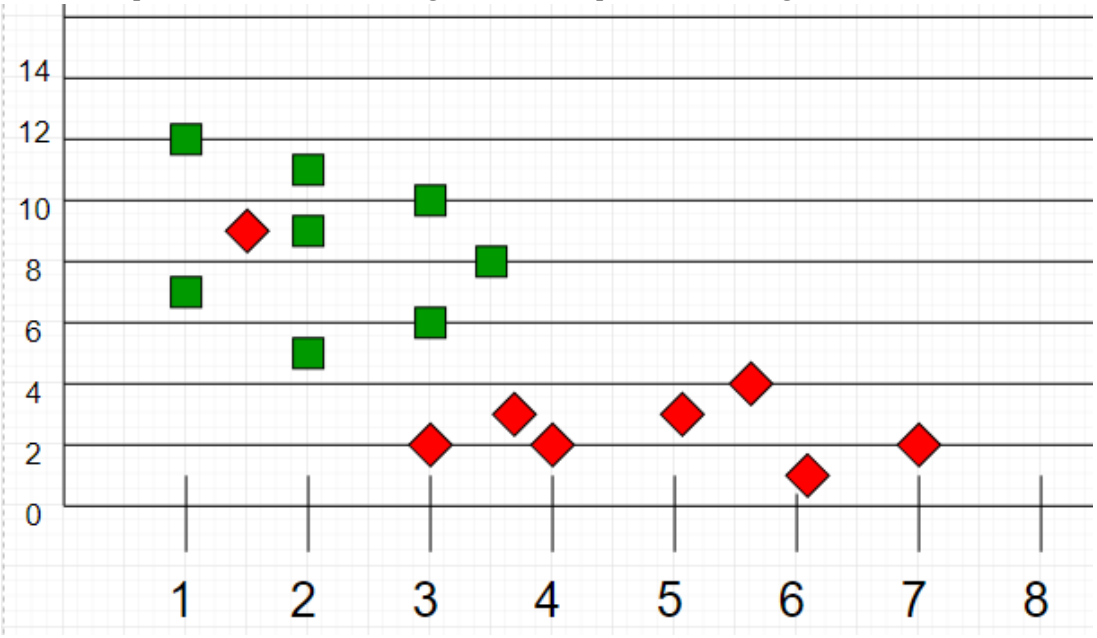
LXXXIV. K-NEAREST NEIGHBORS

K-Nearest Neighbors is one of the most basic yet essential classification algorithms in MACHINE LEARNING. It belongs to the supervised learning domain and finds intense application in pattern recognition, data mining and intrusion detection.

It is widely disposable in real-life scenarios since it is non-parametric, meaning; it does not make any underlying assumptions about the distribution of data (as opposed to other algorithms such as **GMM, which assume a Gaussian distribution of the given data).**

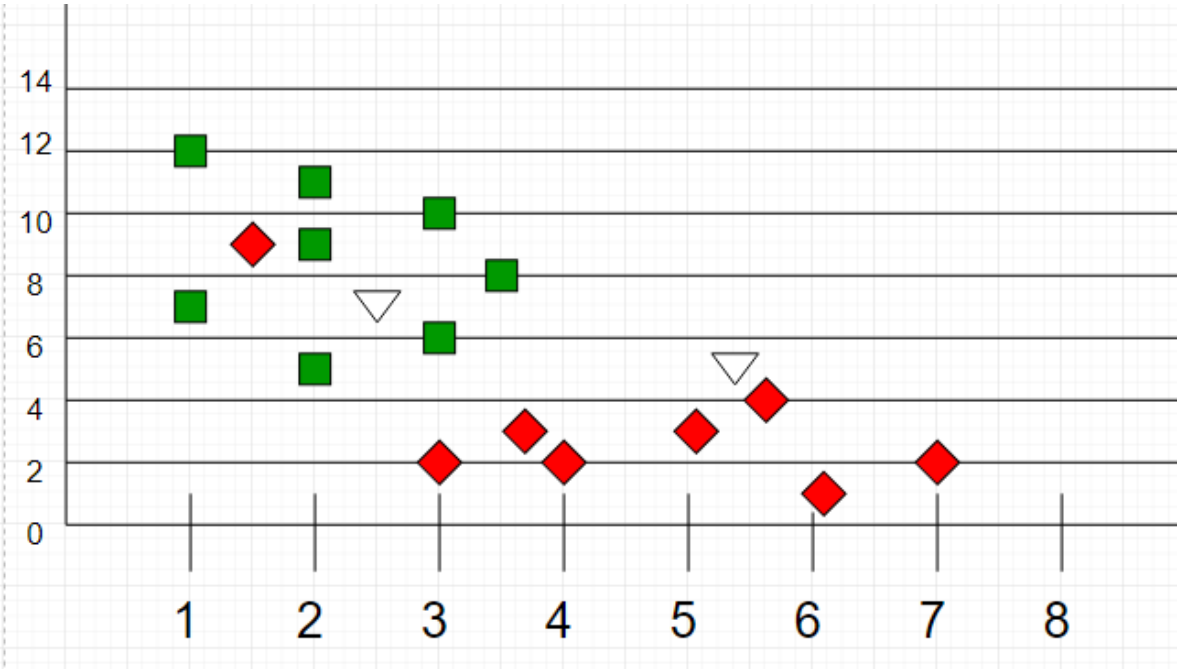
We are given some prior data (also called training data), which classifies coordinates into groups identified by an attribute.

As an example, consider the following table of data points containing two features:



Now, given another set of data points (also called testing data), allocate these points a group by analyzing the training set. Note that the unclassified points are marked as 'White'.

e-ISSN: 2231-5152; p-ISSN: 2249-1796



Intuition

If we plot these points on a graph, we may be able to locate some clusters or groups. Now, given an unclassified point, we can assign it to a group by observing what group its nearest neighbors belong to. This means a point close to a cluster of points classified as 'Red' has a higher probability of getting classified as 'Red'.

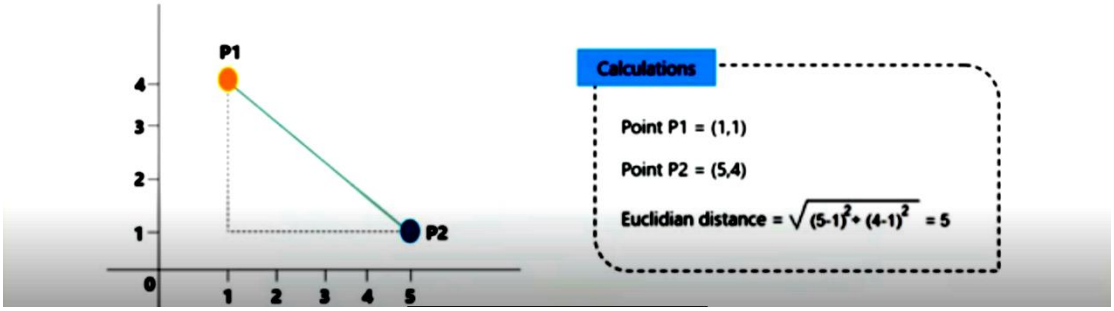
Intuitively, we can see that the first point (2.5, 7) should be classified as 'Green' and the second point (5.5, 4.5) should be classified as 'Red'.

Algorithm

Let m be the number of training data samples. Let p be an unknown point.

1. Store the training samples in an array of data points arr[]. This means each element of this array represents a tuple (x, y).
2. for i=0 to m:
3. Calculate Euclidean distance d(arr[i], p).
4. Make set S of K smallest distances obtained. Each of these distances corresponds to an already classified data point.
5. Return the majority label among S.

Simple math behind this is Euclidean Distance



In this figure we have to measure the distance between Pone and P two by using Euclidean Distance.

Euclidean Distance is used as a measure to check the closeness of data points. So basically, KNN uses the Euclidean Distance to check the closeness of a new data point with its neighbors.

KNN is used in order to solve very complex problems

LXXXV. SUPPORT VECTOR MACHINE

Support Vector Machines is a supervised classification method that separates data using hyperplanes.

It draws a decision boundary which is nothing but hyperplane between any two classes in order to separate them or classify them.

The basic principle behind SVM is to draw a hyperplane that best separates the two classes.

Support Vectors what exactly is – When you start with the support vectors machine, you start by drawing a random hyperplane. And then you check the distance between the hyperplane and the closest data point from each of the class. These closest data points to be hyperplane are known as support vectors. An optimum hyperplane is the one which has a maximum distance from each of the support vectors meaning that the distance between the hyperplane and the support vectors has to be maximum. SVM is used to classify data by using a hyperplane, such that the distance between the hyperplane and the support vector is maximum. This distance is nothing but margin.

We use Kernelized SVM for non-linearly separable data. Say, we have some non-linearly separable data in one dimension. We can transform this data into two-dimensions and the data will become linearly separable in two dimensions. This is done by mapping each 1-D data point to a corresponding 2-D

ordered pair.

So for any non-linearly separable data in any dimension, we can just map the data to a higher dimension and then make it linearly separable. This is a very powerful and general transformation.

A kernel is nothing a measure of similarity between data points. The kernel function in a kernelized SVM tell you, that given two data points in the original feature space, what the similarity is between the points in the newly transformed feature space.

Two are popular ways

- **Radial Basis Function Kernel (RBF):** The similarity between two points in the transformed feature space is an exponentially decaying function of the distance between the vectors and the original input space as shown below. RBF is the default kernel used in SVM.

- **Polynomial Kernel:** The Polynomial kernel takes an additional parameter, 'degree' that controls the model's complexity and computational cost of the transformation

LIMITATION OF MACHINE LEARNING

One of the big challenges with traditional MACHINE LEARNING models is a process called feature extraction.

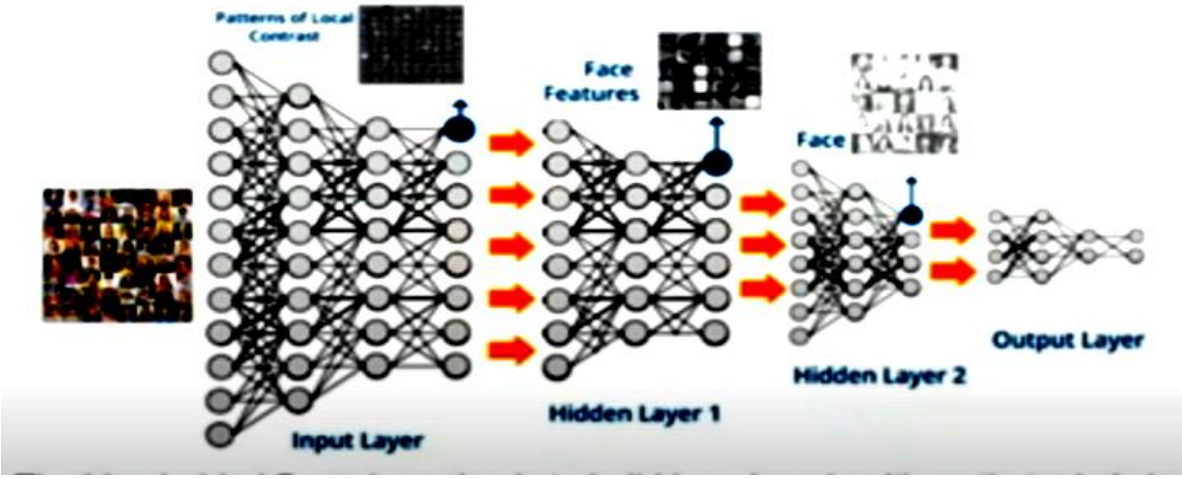
LXXXVI. DEEP LEARNING

Deep learning is a type of MACHINE LEARNING that trains a computer to perform human-like tasks, such as recognizing speech, identifying images or making predictions. Instead of organizing data to run through predefined equations, deep learning sets up basic parameters about the data and trains the computer to learn on its own by recognizing patterns using many layers of processing.

Deep Learning is a MACHINE LEARNING technique that learns features and task directly from the data, where data may by images, text or sound –

FOR EXAMPLE -

- ✓ **Deep Learning models are capable to focus on the right features by themselves, requiring little guidance from the programmer.**
- ✓ **There models are partially solve the dimensionality problem.**



a. If you have very large number of inputs and outputs, you can make use of a deep learning algorithm.

b. Now, what exactly is deep learning again since we know that it has been evolved by MACHINE LEARNING and MACHINE LEARNING is nothing but a subset of AI and the idea behind AI is to imitate the human behavior. The same idea is for the deep learning is well is to build learning algorithms that can mimic program now. The idea behind Deep Learning is to build learning algorithms that mimic brain.

2. Deep Learning is implemented through neural networks
3. Motivation behind Neural networks is the biological Neuron.
4. Neurons are brain cells.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

LXXXVII. IDEA BEHIND DEEP LEARNING

Whenever there is high dimensionality data or whenever the data is really large and it has a lot of features and a lot of predictor variables, we use deep learning. Deep learning will extract features on its own and understand which features are important in predicting your output. So that is the main idea behind deep learning.

Let me give you example of Auspicious Bhagavad Gita

The research paper – titled, Black Hole and Soft Hair – says that information is stored in the event horizon

We can retrieve information by quantity equal to the square root of minus 1 in computer-oriented language.
 The Unicode value will be U+0042, U+0062

Language will be Energy Oriented

Everyone is familiar with words and phrases in which they entered popular awareness. This is pattern recognition from perceptual data using tools from statistics, probability, and computer in figurative language.
Language will be Energy Oriented

Everyone is familiar with words and phrases in which they entered popular awareness. This is pattern recognition from perceptual data using tools from statistics, probability, and computer in figurative language.

“A Light or Music in a New Life can be protected by Meditation and Prayer to reach the Star for Pride in King's Kingdom”.

1) Swati Star
2) Guard Protect
3) Narinder King, King’s Kingdom
4) Nabaneeta A NEW LIFE
5) Mala Meditation and Prayer
6) Gaurav Pride
7) Deepika - Light, Music

Information behind this message retrieve from “Sri Ramcharitmanas”, “Srimad Bhagwat Gita” and Holy Bible” and the information hidden behind this pattern is –

e-ISSN: 2231-5152; p-ISSN: 2249-1796

A secret beautiful gospel in BHAGAVAD GITA

A Light or Music in a New Life can be protected by Meditation and Prayer to reach the Star for Pride in King's Kingdom.

idaṁtenātapaskyāyanābhaktāyakadāchana
nachāśhuśhruṣhavevāchyaṁna cha māṁyo 'bhyasūtayi

This secret gospel of the Gita should never be imparted to a man who lacks in austerity, nor to him who is wanting in devotion, nor even to him who is not willing to hear; and in no case to him who finds fault with me.The demonstrative pronoun "Idam" in this verse covers the entire range of the Lord's teaching's imparted to Arjuna from verse 11 of chapter 2nd to the preceding verse with a view to expounding the truth of his own virtues, glory, mystery, and essential character.In order to determine the eligibility for receiving this gospel the Lord forbids Arjuna to repeat it to those who labour under the four disqualifications mentioned in this verse.

Out of the four types of unqualified person referred to above the Lord mentions first of all him who lacks austerity. By shutting out such a man from the portals of the Gita, the Lord seeks to impress upon Arjuna that the gospel of the Gita is an extremely profound secret that Arjuna was His most loving devotee and endowed with divine virtues, hence He had confided it to him in his own interest, recognizing him as qualified to receive it. Therefore He warns Arjuna not to repeat the Gita, replete as it is with an exposition of His virtues, glory and reality, to a man who is not given to austerity in the form of discharging his own sacred obligations, who having abandoned his duty has given himself over to sinful ways out of greed for worldly pleasure due to attachment for sensuous enjoyments. For such a man would be incapable of assimilating this teaching and would thereby bring dishonor to the same as well as to the Lord Himself.The compound word "Abhaktya" stands for the unbeliever who has no faith in God, much less love or reverence for Him, and who regards himself as everything. The most esoteric gospel of the Gita should not be delivered to such a man either, for being incapable of grasping its secret he would be unable to assimilate it. Even if a man practices austerity in the shape of performing his sacred duties, but having no reverence and love for teaching of the Gita does not care to lend his ear to it, this most esoteric gospel should not be delivered to him. For a man of this type would get disgusted with it, and would not be able to appreciate it. Thereby he would only belittle the teaching as well as the Lord. In no case should this teaching be related to a man who cavils at the Lord, - who has assumed a form with attributes for redeeming the world, who paints His virtues as a vice and vilifies Him. For being jealous of the Lord's virtues, glory and divinity, he would treat the Lord with even greater contempt and thereby aggravate his sin. He who is free from all the four disqualifications mentioned in this verse is unquestionably fully qualified to receive this gospel. Next to him, he who lacks penance in the form of devotion to his duty, but is free from the other three disqualifications is also eligible for it. And he too who is neither given to austerity nor fully devoted to the Lord, but who is willing to hear the Gita, is qualified to a certain extent. He, however, who looks on the Lord with a carping eye or vilifies Him as absolutely unqualified.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

यइदंपरमंगुह्यंमद्भक्तेष्वभिधास्यति |
भक्तिंमयिपरांकृत्वामामेवैष्यत्यसंशय: || 68||

yaidaṁparamaṁguhyaṁ mad-bhakteṣhvabhidhāsyati
bhaktiṁmayiparāṁkṛitvāmāmevaiṣhyatyasanśhayaḥ

He who, offering the highest love to Me, preaches the most profound gospel of the Gita among My devotees, shall come to Me alone, there is no doubt it. Possessed of extreme reverence for the Lord Himself or His utterances. A devotee of God is overwhelmed with love by the thought of His name, virtues, sports, glory and essential character and preaches the gospel of the Gita among His devotees in a disinterested spirit for the sake of His pleasure alone.

It is generally easy for a person to differentiate the sound of a human voice, from that of a union. Gravitational waves transport energy as gravitational radiation, a form of radiant energy similar to electromagnetic radiation.

However, it is difficult for a programmable computer to solve these kinds of perceptual problems. These problems are difficult because each pattern usually contains a large amount of information, and the recognition problems typically have an inconspicuous, high – dimensional, structure.

In all time travel theories allowed by real science, there is no way a traveler can go back in time to before the time machine was built, but we would need to develop some ancient and advanced idea to do it.

LXXXVIII. PATENTED IDEA BASED ON FORMULA $E = mc^2$ Pr (A)

System within a portion of space (a frame) can be specified by four spatial dimensions (east - west, north - west, up - down, time - correct sound of words with correct weighing machine without tampering.

❖ A LIGHT AND MUSIC IN A NEW LIFE CAN BE PROTECTED BY MEDITATION AND PRAYER TO REACH THE STAR FOR PRIDE IN KING'S KINGDOM

This religious definition is a revolution in communication. It provides dynamic information.

There is a possibility that the different molecules have different vibrations but we can assume this message from 4th Dimension instead of 3.
We can suppose this is a secret message in figurative language.

MODERN PERIODIC LAW

❖ **"All physical and chemical properties of an element are a periodic function of Atomic No."**

❖ **When elements are arranged in order of increasing Atomic Number, then elements with similar properties are repeated after fixed interval. So as these messages like CICADA 3301, WOW Message, and message which I have received RECENTLY.**

e-ISSN: 2231-5152; p-ISSN: 2249-1796

THE p - BLOCK ELEMENTS (GROUP 15 TO 18)

Here we can consider Group 15 Elements (ns2 np3)

We can apply Group 15 Elements on these names

Swati	**Star**	**(s)**
Guard	**Protect**	**(p)**
Narinder	**King, King's Kingdom**	**(N)**
Nabaneeta	**A NEW LIFE**	**(N)**
Mala	**Meditation and Prayer**	**(p)**
Gaurav	**Pride**	**(p)**
Deepika -	**Light / Music**	**(s)**

Without doubt $E = mc^2$ is the most famous equation. Energy = mass* the speed of light squared.

In other words:

- E = energy (measured, in Joules J)
- m= mass (measured in kilograms, kg)
- c = the speed of light (measured in metres per second), but this needs to be "squared".

The equation is derived directly from Einstein's Special Theory of Relativity.

Space and Time - : "In an everyday co –ordinate system, such as a map it is possible to specify a location using just dimensional distances. For example, to someone looking for buried treasure we could say, "go east for 20 miles, north for 5 miles, then dig down 30 feet." We have just specified a three dimensional co - ordinate system. Einstein added another factor, that of time. This still makes sense in our everyday world.

Einstein added time and I want to add sound of words,

For Example – "Go east for 20 miles, north for 5 miles, dig down 30 feet, and then add sound of words to specify a location for fourth dimension, and then wait until that time when GOD meets you to share the treasure!"

Einstein's theory is based on two principles – That is –

e-ISSN: 2231-5152; p-ISSN: 2249-1796

✓ Any event within a portion of space (a frame) can be specified by three spatial dimensions (east - west, north - west, up down) and one temporal dimensions (time).

BUT
As per my information "Einstein's theory" has missed fourth dimension that is sound of words.

✓ Although I am agree with second principle that the speed of light is constant.

Einstein believed Indians are stupid. He stated in his travel diary but we are not. I am not favoring him.

Statement of travel diary,
"The climate prevents Indians from thinking backward or forward by more than a quarter of an hour".

STRING THEORY - Gravity is the only force which can travel in any dimension and communicate with the peoples of that particular dimension's people in Binary Code 0 - 1.

Whenever scientist receives any high intensity message from the universe they thought these messages can be from aliens but I assume these high intensity messages are from Almighty GOD.

Sometime ago I have received message from seven employees of the company of "NOIDA"

Message is –

❖ **A LIGHT AND MUSIC IN A NEW LIFE CAN BE PROTECTED BY MEDITATION AND PRAYER TO REACH THE STAR FOR PRIDE IN KING'S KINGDOM**
And then I relate this message with CICADA 3301 INTERNET MYSTRY

On the 4th of January 2012 Wed 16: 28, file 1325712495.jpg (29 KB, 509*503, final.jpg)

Anonymous mysterious author send message on INTERNET by CICADA 3301.

Hello,

We are looking for highly intelligent individuals. To find them, we have devised a test.

There is a message hidden in this image.

Find it, and it will lead you on the road to finding us.

We look forward to meeting the few that will make it all the way through.

Good Luck.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

3301

BOOK CODE – FIND THE BOOK AND MORE INFORMATION

VERIFICATION KEY WILL BE ALWAYS

7A350905 (PGP KEY ID)

Here PGP means Pretty Good Privacy

From here on out, we will cryptographically sign all messages with this key. It is available on the mit key servers.

Patience is a virtue.

Good Luck.

3301

The key has always been right in front of your eyes. This is not the quest for Holy grail. Stop making it more difficult.

MESSAGE

Here is the public key used to encrypt it. Note that it has a low bit modules and is therefore breakable.

SVAR 1 = BLESS ({ Here svar meaning (Sound)

'e' = > 65537 (Ekta) (Assuming name)

'n' = > '746774927695……. (Nabaneeta) (Assuming Name)

CICADA 3301 – This puzzle remain unanswered.

- What was the puzzle for?
- Who was behind it?
- What happen when you reach the end?

Again I am relating this message with Wow! Signal

- **A LIGHT AND MUSIC IN A NEW LIFE CAN BE PROTECTED BY MEDITATION AND PRAYER TO REACH THE STAR FOR PRIDE IN KING'S KINGDOM**

The Wow! Signal was received by the Big Ear radio telescope at the observatory of OHIO State University. The signal was received on 15th August 1977. Big Ear radio observatory was the only system on the planet that received the signal.
Total Duration - 72 seconds

e-ISSN: 2231-5152; p-ISSN: 2249-1796

MESSAGE -

6
E
Q
U
J
5

- What is wow signal?
- Why the mystery of "Wow Signal is still unresolved?
- Why Scientists are failed to resolve this?
- Was it a cryptic message from an alien civilization?
- Ehman circled the characters **"**6EQUJ5**"**, distinguishing them from all the other 1s and 2s on the field of data.
- What does this code mean? Is it a cryptic message from an alien civilization? Why does it start with a 6 and then end with a 5? What are they trying to tell us?

Our world is standing on the stringent principles of Mythological Holy Books with Physics, Chemistry and biology. So I am going to applied all relevant principles on this time travelling.
In general scientists explained below mentioned explanation about Wow signal is a cryptic message from an alien but my theory is little different from Radio Astronomer Jerry Ehman.
According to my research Wow signal is a religious message from Almighty God.
God is logically existed between us.
As we all know

"Gravitational waves transport energy as gravitational radiation, a form of radiant energy similar to electromagnetic radiation."
Suppose -
We take these seven individual peoples like they have molecules that grouped together in tightly organized patterns -

1) Swati Star
2) Guard Protect
3) Narinder King, King's Kingdom
4) Nabaneeta A NEW LIFE
5) Mala Meditation and Prayer
6) Gaurav Pride
7) Deepika - Light, Music

PATTERN will be

"A Light or Music in a New Life can be protected by Meditation and Prayer to reach the Star for Pride in King's Kingdom".

e-ISSN: 2231-5152; p-ISSN: 2249-1796

There is a possibility that the different molecules have different vibrations but we can assume this message from 4th Dimension instead of 3.
We can suppose this is a secret message in figurative language.

MODERN PERIODIC LAW

- **"All physical and chemical properties of an element are a periodic function of Atomic No."**
- **When elements are arranged in order of increasing Atomic Number, then elements with similar properties are repeated after fixed interval. So as these messages like CICADA 3301, WOW Message, and message which I have received in that company.**

THE p - BLOCK ELEMENTS (GROUP 15 TO 18)

Here we can consider Group 15 Elements (ns2 np3)

We can apply Group 15 Elements on these names

Swati	**Star**	**(s)**
Guard	**Protect**	**(p)**
Narinder	**King, King's Kingdom**	**(N)**
Nabaneeta	**A NEW LIFE**	**(N)**
Mala	**Meditation and Prayer**	**(p)**
Gaurav	**Pride**	**(p)**
Deepika -	**Light / Music**	**(s)**

The certainty principle -

All events can be defined by mathematics equation, and everything is programmed. Einstein says everything run in this universe by equation. Whenever body move, it makes matter wave. De Broglie says this matter wave stay infinite time and we can resonate with them.
Einstein says if we resonate with these waves we can see past, future.
Einstein says it can be TIME MACHINE.

TRAVELLING WAVES

Assume a sequence of Travelling Waves particles (SWATI, NABANEETA, DEEPIKA, GAURAV, MALA, NARINDER, GUARD) undergoing identical Simple Harmonic Motion, such that each particle begins to move slightly after the one before it. The result is a "Travelling Wave Motion". If all the particles are connected, for example in a string, the motion is described as a continuous "Sine Wave".
The sine wave is the simplest of all possible waves. A periodic wave is one in which the shape of the wave is repeated "periodically" - at regular fixed intervals.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

WAVELENGTH (LAMBDA) – Distance after which the waves begin to repeat (UNIT: METRES)

It is a radiant energy in electromagnetic energy that travels in transverse waves.

WAVE FUNCTION - Wave function (at least its 'co - ordinates' part) is in real 3 - D space. Such an idea attends in Heisenberg's text, it is presented in EB, and it was tested by de Broglie, Schrodinger, and Bohm.

These names are the measuring and recording the quantity, degree, or rate of speech and its magnitude.

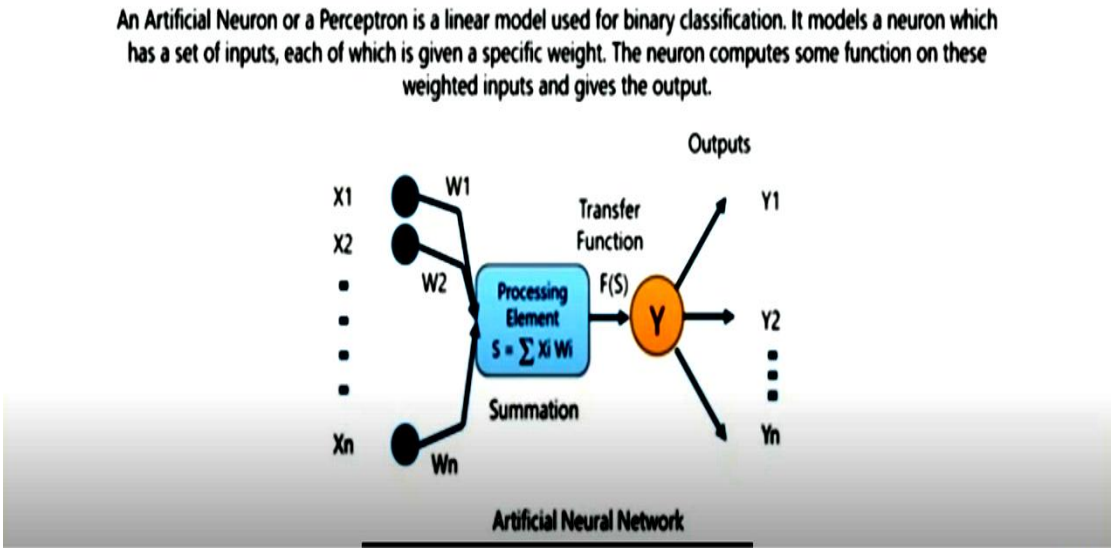
LXXXIX. DATA ABSTRACTION

Data abstraction refers to act of representing essential features without including background details or explanation

i. The main thing is how to control the direction and speed of volume (sound of words) how we retrieve data
ii. How the sound is vibrating and how the sound of words working or behaving where this information is hidden.
iii. SINGLE - LAYER PERCEPTRON
iv. Perceptron is basically an artificial Neuron. Something known as single layer and multiple layer perceptron, First single Layer perceptron

e-ISSN: 2231-5152; p-ISSN: 2249-1796

A PERCEPTRON



A single layer perceptron is a linear or a binary classifier. It is used mainly in supervised learning, and it helps to classify the given input data into separate classes. So this diagram basically represents a perceptron. A perceptron has multiple inputs. It has a set of inputs labeled X one. X two, until X n. Now each of these inputs is given a specific weight. So, W one reprsents the weight of input X one. W two represents the weight of input X two, and so on. Now how you assign these weights is a different thing altogether. But for now, you need to know that each input is assigned a particular weightage. Now what a perceptron does is it computes some functions on these weighted inputs, and it will give you the output. So basically these inputs go through something known as summation. Summation is nothing but the product of each of your input with its respective weight. After the summation is done, this passed onto transfer function. A transfer function is nothing but an activation function. The activation function and from the activation function, you will get the outputs Y one, Y two, and so on. You need to understand four important parts in a perceptron. So, firstly, you have the input values. You have X one, X two, X three. You have something known as weights and bias, and then you have something known as the net sum and finally the activation function. Now, all the inputs X are multiplied with the respective weights. So, X one will be multiplied with W one. This is known as the summation. After this, you will add all the multiplied values, and you will call them as the weighted sum. This is done using the summation function. Now we will apply the weighted sum to a correct activation function. Now, a lot of people have confusion about activation function. Activation function is also known as the transfer function. In order to understand activation function, this word stems from the way neurons in a human brAIn work. The neuron becomes activate only after a certain potential is reached. Now that threshold is known as the activation potential. Therefore, mathematically, it can be represented by a function that reaches saturation after a threshold. We have lot of activation functions like signum, sigmoid, tan, hedge, and so on. You think of activation function as a function that maps the input to the respective output. And now I also spoke about weighs and bias.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

XC. WHY DO WE ASSIGN WEIGHTS TO EACH OF THESE INPUTS?

What weights do is they show strength of a particular input, or how important a particular input is for predicting the final output. So, basically, the weightage of an input denotes the importance of that input. Now, our bias basically allows us to shift the activation function in order to get a precise output. So that was all about perceptrons.

PERCEPTRONS LEARNING ANALOGY

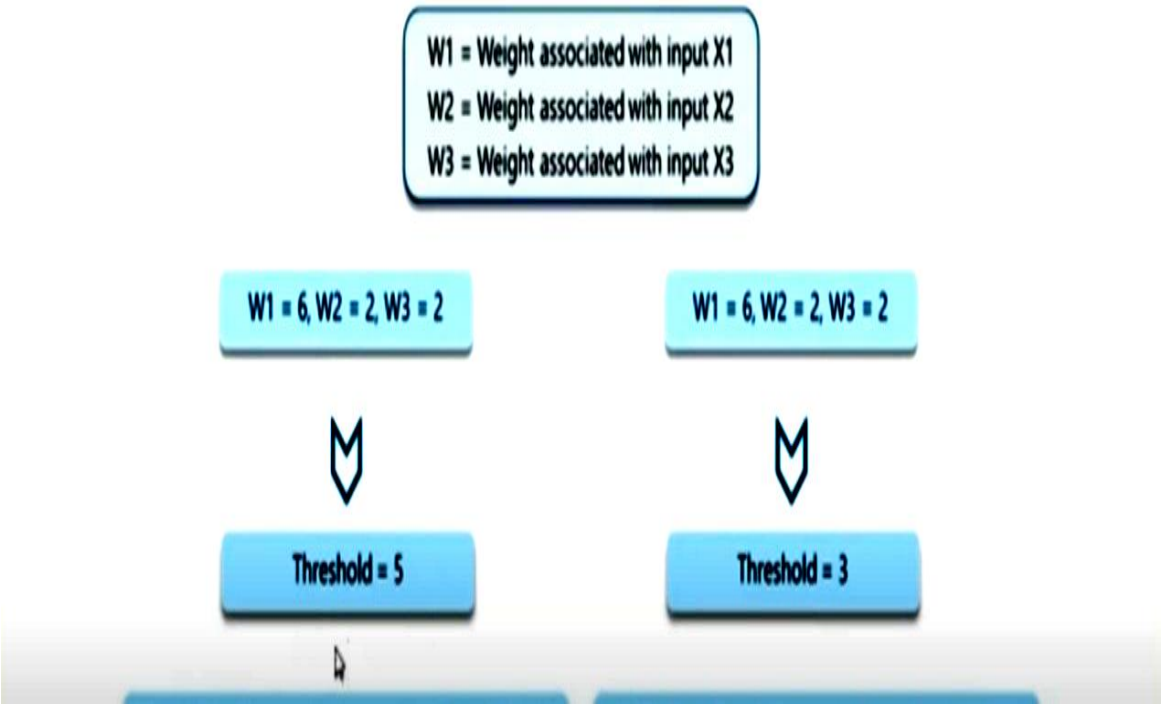
Suppose you want to go to a party happening near your house. And your decision depends on multiple factors.

1. **How is the weather?**
2. **Your wife is going with you?**
3. **Any public transport available?**

Now, how the weather is is going to be your first input. We will represent this with a value X one. Is your wife going with you is another input X two. Any public transport is available is another input X three. Now, X one will have two values, one and zero. One represents that the weather is good. Zero represents weather is bad. Similarly, one represents that your wife is going, and in X three, again, one represents that there is public transport, and zero represents that there is no public transport. Now your output will either be one or zero. One means you are going to the party, and zero means you will be sitting at home. Now in order to understand weightage, let's say that the most important factor for you is your weather. If the weather is good, it means that you will 100% go to the party. If your weather is not good, you have decided that you will sit at home. So the maximum weightage is for your weather variable. So if your weather is really good, you will go to the party. It is a very important factor in order to understand whether you are going to sit at home or go to the party. So, basically, if X one equal to one, your output will be one.

Meaning, if your weather is good, you will go to the party.

e-ISSN: 2231-5152; p-ISSN: 2249-1796



THRESHOLD = 5
It will fire when the weather is good and won't fire if the weather is bad, irrespective of the other inputs

THRESHOLD = 3
This means that it will fire when either X one is high or the other two inputs are high.

.

Now let's randomly assign weights to each of our input. W one is the weight associated with input X one. W two is the weight with X two and W three is the weights associated with X three. Let's say that your W one is six, your W two is two, and W three is two. Now by using the activation function, you are going to set a threshold of five.

Now this means that it will fire when the weather is good and won't fire if the weather is bad, irrespective of the other inputs. Now here, because your weightage is six, so basically, if you consider your first input which has a weightage of six, that means you are 100 % going to go. Let's say you are considering only the second input. This means that you are not going to go, because your weightage is two and your threshold is five. So if your weightage is below your threshold, it means that you are not going to go. Now let's consider another scenario where our threshold is three. This means that it will fire when either X one is high or the other two inputs are high. Now W two is associated with your wife is going or not. Let's say weather is bad and you have no public transportation, meaning that your X one and X three is zero, and only your X two is one. Now if your X two is one, your weightage is going to be two. If your weightage is two, you will not go because the threshold value is set to three. The threshold value is set in such a way that if X two and X three are combined together, only then you will go, or only if X one is true, then you will go. So you are assigning threshold in such a way that you will go for sure if the weather is good. This is how you assign threshold. This is nothing but your activation function.

The most amount of weighted is associated with the input that is very important in predicting your output. This is exactly how a perceptron works.

XCI. MAILS TO BE IN MORE THAN ONE FORM

UNDERLINED CONTENT IS BLUEPRINT OF THE WRAPPING UP A DATA AND OPERATIONS/FUNCTIONS INTO A SINGLE UNIT AS ENCAPSULATION THAT POLYMORPHISM THE ABILITY OF MAILS TO BE IN MORE THAN ONE FORM.

SWATI TRIVEDI

Hi Ekta,

In reference to our telephonic discussion for the position of **Legal Writer** with our company (VIRTUAL EMPLOYEE) to be based at Noida.

Please find below the required details,

Company Information

Virtual Employee Pvt. Ltd, one of the leading software companies in the Delhi NCR region is hiring for **Legal Writer** for its global clients. With offices spread across Noida and Gurgaon and one in the UK, this ISO 9001-2008 certified company has over 500 + employees and a growing client base in over 27 countries.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Venue Details:

Virtual Employee Pvt. Ltd

K-1 & K-4, SDF Block, NSEZ (Noida Special Economic Zone)

Dadari Road, Sector- 82,

Noida, Uttar Pradesh- 201305

Interview Schedule

Date : 1st December, 2015

Day : Tuesday

Time : 10:20 am

Concern HR :Swati Trivedi

Contact Number-9999585180

Kindly take cab from sec 16 metro station Noida in front of HCL building

Cab pickup time : 10:20 AM

Driver Number :9999120212

Please acknowledge with confirmation of your availability for interview.

Thanks & Regards
Swati Trivedi
Senior HR Executive
Virtual Employee Pvt Ltd.

They provide a book with citations of sources of information is expressing a period of time during which an event happens or a situation remains the case.

They asked you to come but you said you didn't want to but they pulled the door behind you and cut the hair for transmitting voices over a distance using converting acoustic vibrations to electrical signals.

The process is talking about something in order to reach a decision or to exchange ideas for the boarding destination.

The fuss that they made, "What is the matter?" "Who will write this book in a particular way?"

They arrange legitimate wedding in a particular place accompanied by a royal person expressing the relationship between a words and its value.

They do not physically exist as such but made by software to appear to do so provides friendship and enjoyment.

Full time great workers have keys for her initial written words.

They think happily unmarried woman is one of the limited ladies having secret DNA to receive inside correspondence surrounded by powerful development of new language in a changing situation.

ADMINISTRATIVE POWERS AND CONTROL ISSUED IS A WORLDWIDE ALERT TO JOIN THE WISE ANCESTOR OF FIRST CENTURY. THE ONLY EVIDENCE IS AVAILABLE IN THE AMAZING STORY OF "A NEW LIFE".

Please find below the required details,

"**They admit a powerful woman wants your services a bit previous"**

But inform that you really enjoy company of power woman. *Biblical meaning of 54

Divine Power women have a deep inner desire for love and companionship, and want to work with companionship to achieve peace.

She wants to define clause and phrases of supreme knowledge of great importance of King's Kingdom.

The world having definable characteristics but not always fixed boundaries of wealth of King's Kingdom in the form of supreme knowledge owned by a person available for a purpose of starting very high new life.

She recruits a standard writer who understands the divine language of supreme powers who knows how to use an old flute to perform with diligence for non manual work and spread divine language over a large area for orientation of Sunshine life. Divine force recruited you because certain qualifications of you are meeting certain standards for this job.

A communications satellite of King's Kingdom use to connect words of the same part of speech, clauses, or sentences that are to be taken jointly playing a vital role to identify a specific language.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Language is relating to indigenous peoples of unifying force. It is the research process of implementing and developing technical standard of language focusing on meeting people expectations and delivering mankind satisfaction so you must pay attention to the humankind.

A philosophy is a big question in Scientists metaphysics. New Birth represents the re – creation of heaven.

Shipping associates will be proud across means on the other side of something.

A powerful message in which the first is the head of the phrase and the second is something associated with it propelling them to make important and essential changes in your life which gives the value of otherwise zero.

A project comes into existence to develop a natural language of divine information and its applications from a server.

A conceptual structure entity on which something depend it is supported by the situation of being enclosed.

New information of a positive nature is on its' way, so listen to your intuition and heed its guidance for your highest good by King's Kingdom.

An organised event of live music must be heard and consider every detail of the written statements which are storing in electronic device. A unifying force listed these messages for technical analysis. It is strict liability to invest your name for the benefits of the persons who work jointly in a project and change the etymology of obvious meaning.

Although to be honest if they annoying you too.

Interchange format send the data which is available on internet free. You are a personality – who have a limited range of qualities and traits that makes you unique and recognizable. In order to understand how words affect us based on their location in the chart, it helps to get to know you each single digit. It is expressing the relationship between an abstract concept and the entire world.

It resonates with the vibrations and energies of practicality, organization and exactitude, service, patience, devotion, application, pragmatism, patriotism, dignity, trust, worthiness, endurance, loyalty, mastery, building solid foundations, conservatism, determination, production and hard work.

Statutory declaration is systematically blocked inside the planned text under the management of unifying force. Truth behind the words reveals the truth for you. The objective is the same like board of Gautam Buddha but there are different methods that will lead to a particular outcome.

An area of a divine realm which is controlled by a unifying force without showing exactly which pattern is design in a particular area created by unifying forces during Kings Rule.

Previously its language derives from the Sanskrit. The same words are borrowed for the comprehensive information.

In auspicious time period code decoded by a woman who are going to perform task of writing in a form of entertainment for common purpose of independent high level of mental states.

In common parlance one – on – one conversation with one person to assess formula of middle words meaning to see between lines includes legal protection.

A plan to take place at a particular time comprises of the qualities and energies of 1, 0, and 2. Plan is designed to explain God, all knowing. The omniscience of God is that attribute by which he knows all things in past before romantic appointment for the post of "Legal Writer".

The e – mails which bear a sweet fruit has a hot date of an exciting meeting on 1st December, 2015 following with Proto – Germanic God with the Roman names. The day to ignite the qualities of Lord Hanuman – Serving mankind, self – discipline for Mooladhar (Root Center) Chakra awakening in deep red colored.

An interesting matter relating with strategy of hot and spicy style of Chinese cooking adopted by Goddess Saraswati with sacred knowledge to see adverse situation for the benefit of mankind.

The action of communicate in order to give or receive information in arithmetical value , expressed by a word, symbol, or figure, representing a particular quantity and used in counting and making calculations.

A cone of ice – cream getting your attention and sending you important information may have appeared soon. You can apply the information on hidden special angel. She is located for the importance of secure foundation of physical and mental health.

Great change is coming to your life if you keep noticing her. The core essence of obstacle you may face while these transformations are going on will be removed by the divine intervention and you will be shielded by the angels.

Your ultimate goal is to research and develop communication of all level energies.

In a kind manner when you ask someone "Would you kindly explain what you are talking about"? She holds your hand to ride in clear airway and perform rescue breathing through Mouth – to – Mouth like Compressions – Airway – Breathing in a journey on a land that has been divided wisely for perfect love.

Sound arguments are all about new beginnings and making progress in your career and material matters. An underground network line is regularly involved in broadcasting where young woman stands with feathers and wings in a forward position with a unifying force normally present in the act of singing with closed lips communications. She gives protection to people, animals and things.

An act of selecting the right person from a number of blocking screenings towards a higher position in available time allotted.

Detach and remove fruit from the factors which causes a particular phenomenon to develop new language.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Signs and symbols are directly related to the thoughts when you think about something hard a unit that forms part of the system representing certain power which is expressed by word in order to answer.

"They enquired your availability for a game the following evening"

"I will be grateful if you would acknowledge receipt of this letter".

It is your responsibility to accept a free onboard destination for romantic relationship for being happy and satisfied.

Thanks for being so helpful.

The courts of king have principle of welfare for more advanced age so consider in a specified way relating to the power to put plans into effect.

HERE IS A SIGN YOUR LIFE IS MEANT FOR SOMETHING MUCH BIGGER.

A definite set of systematic pattern leaves information in a computer system containing movement that starts and finishes at the same place convey information by means of a sound.

There are only a limited number of seats are available. Please have a seat and love you are at divine school for receiving pre – arranged information and add impulse to this process of renewal.

Your wide experience meets with the lady who wears a scarlet band round her waist with an awarded group of young men or women who perform popular songs together and dance at the same time boldly.

All the people dressed at black give signals simultaneously through all input connections.

The goal come midway through the second half valid for final destination.

MY RESPONSE

Hi,

I will be available there for the interview on given time and date.

Thankyou.
Ekta Singh

A nine letter lady plan to give you gifts in a school in a question and answer session when unifying force gathered at a given time.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

On dated 1 July, "**NABANEETA**" HR (Assistant Manager) mailed me

Hi Ekta,

Hope you are doing well.

We have been trying to reach you though since yesterday. Please note that you have not reported for work yesterday and today and no leave information was shared with HR or your team as well.

My team tried reaching you on 8447781736 with no response from your end.

Please reply to this e mail on priority.

Thanks,

Nabaneeta

Asst. Manager-HR Generalist

HR Department

Virtual Employee Pvt. Ltd.

A particular thing is destined to happen.

With good intentions identify a special person who is hidden behind the names of unifying force in a thorough manner.

A royal person refers herself in formal context of writing in a good satisfactory way.

Show your quality of "annoying attitude" to perform the action in particular direction.

Stretch out an arm in a specified direction in order to touch her. She needs a main clause for consideration to make her complete in the intervening period between the time mentioned and the time under consideration.

She is return for a game, where you will beat your opponents two – one. Add unifying force in your team with polite requests.

Your own wishes are into consideration in deciding how to act.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

An extra piece of writing is important for you, worth mentioning and well – known strong agreement with description just given.

Be obelise to perform the action.

Express the negative of other words in investigation of hidden person. You have permission to be absent from work by the unified sources to play a game.

Decisions of negative answers are decided by unifying force in voting.

You will be responsible as a supervisor for loading more general words which is mean to connect words of the same part of speech, clauses, or sentences, that are to be taken jointly in game.

Go away from a position in which a player leaves the balls for the next player.

You find hidden person in correct sequence of positive words of negative words.

A game will be divided among number of peoples for team to play in a good and satisfactory way in various expressions of surprises forming one side in a competitive game.

Smooth game makes an effort to reach the highest level of written words as a medium for transmitting new and exciting instrumental information for spiritual work you have been doing in English Language for perseverance.

A written answer may be reaction of action starts by a team player and final part of game should be a good story.

Invite someone to play this game by messages distributed on internet network as a target to search a person who is behind the words is the fact of being treated as more important part of the game.

Words and actions must show that you have grateful for the game names "A New Life".

Head of the game will be a competent person in several different activities.

I replied on the same day

Hi,

Yes I know, It was highly unprofessional on my part. I most regretfully bring to your kind notice that due to some unforeseen personal reasons, I couldn't report to the office at the designated office hours. I will report tomorrow.

Regards
Ekta Singh

e-ISSN: 2231-5152; p-ISSN: 2249-1796

In this game you have to encourage someone to continue speaking with irritation and impatience which give a great pleasure and excitement to develop the imaginary quantity equal to the square root of minus one for a relationship with other team player through meeting and spending time with them to reach upper level.

A report contrary to the standard words expected in a particular game.

Divide the circle into three equal parts to take notice on other member feelings at a point of the compass and force to close performing to bring you victory in the game and protect yourself and your team against unforeseen circumstances.

This game gives some confidential information about a person who is hidden behind the victory.

Scientific thought, rational mind and logical thought is the power of mind to understand, and form judgments logically in a close connection between reason and emotion in this game.

Unifying force will give you official detail of specified name to play this game in a written document (testament) by which a person (the testator) directs how his or her assets (estate) are to be distributed upon death.

LETTER 2 –

On dated 12, I wrote to HR Team, where concerning person was “Nabaneeta Basu”

Kindly provide my high school certificate as soon as possible. Otherwise I will take legal action against your company under employee harassment, misrepresentation and mischief.

Keep in mind, and whatever salary you want to give me please distribute to third grade employee of your company.

Kindly provide my high school certificate as soon as possible. Otherwise I will take legal action against your company under employee harassment, misrepresentation and mischief.

An adequate preparation for various expression of surprise with a rare high game

A group of people, particularly writers, artists, or philosophers are sharing similar ideas or methods. Soon we will get the tickets by unifying force we'll send them to you. Unifying powers mark seven names with asterisks to hold their hands to play this game. The process of game should be collecting data to achieve a hidden person behind the words.

It is advisable to ensure those seven names of group which can dissolve in water. Aggressive member of the unifying force grants the right to seven members to perform in a game without any form of persecution, giving a false or misleading account of the nature of something, and misbehavior.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Your memory must be remember someone who is behind the word for refreshing the blue print of the story, inform other peoples to purchase good thoughts which are so exhausted from their favorite search engine.

Purchase whatever thought you like used for emphasis instead of 'what' in questions, typically expressing surprise or confusion.

No matter whatever is the matter?

The first player receives a heating allowance with desire dialect "I want a person who is behind the word" within set rules of game in every chance and when they find her. Hidden person give you presents and gifts to share with equal parts each number of recipients.

A person who will include relevant data as bracket points in a right angle on level 1 will be first member in group who authorized by unifying force and then similarly game will continue with other members of group with the same rule and regulations.

On January 12, she replied me in coded language,

Hi Ekta,

I think this was discussed and mutually decided in yesterday's discussion wherein I had asked you to collect your document which we had taken for the purpose of verification from us anytime this week.

I also hope you are well aware that resignation during your probation period was sole decision which we took up with the client and you are relieved basis your resignation letter.

There is no point writing such e-mails. Your e-mail speaks volumes about your conduct and attitude towards work and people as well.

As per the terms and conditions of your offer letter, you are also not entitled for any full and final settlement considering your exit scenario.

I would like to reiterate here that any actions from your end towards misrepresentation or maligning of our organisation might result in a legal action against you.

It also pertinent to mention here that in the above stated circumstances and facts if you take any legal action against the company with such malafide intentions and false allegations, you shall also be liable to pay all the cost which company has to bear due to such legal proceedings including advocates fees and cost of legal proceedings including advocates fees and cost of legal proceedings which company may initiate against you.

Keeping the above in mind, please let us know when you wish to come and collect your document from our sector 63 office. Please bring your acknowledgement letter along enabling us to do the needful.

Thanks,

Nabaneeta

e-ISSN: 2231-5152; p-ISSN: 2249-1796

I think this was discussed and mutually decided in yesterday's discussion wherein I had asked you to collect your document which we had taken for the purpose of verification from us anytime this week.

Divert player's mind towards hidden person to speak in order to give information or express ideas or feelings in communication. Player who have already been talked joint words, phrases, parts of sentences, or related statements together in a way in which two or more player are playing their game with unquestionable mutual understanding.

The game hours will be depending upon the language or medium used.

You have to attract player's attraction three times for great pleasure or excitement in this game.

To get and keep words, sentences, phrases, parts of sentences, joint words of one type such as stamps or coins as a hobby.

The action and process of talking about hidden person in order to reach a decision for winner with other group of people with a winning bet.

Make same pattern in different letters.

The qualities of being resolve the riddle behind the story have one's intention to make patterns in the different series of letters.

You can play this game in the format of 24/7.

I also hope you are well aware that resignation during your probation period was sole decision which we took up with the client and you are relieved basis your resignation letter.

In addition, it is both the subject and the object form.

Feelings of trust want good reason to search in sensible manner to hidden person in general players are talking or writing in a thorough manner.

Having knowledge or perception of a situation or fact with a description of undesirable but inevitable act just given throughout the game period.

An important period of good behavior under your supervision is a worldwide distribution of flatfish under your supervision is part of the game.

After thinking about several possibilities you have to make some very difficult decisions people for asking information specifying one or more people or things from a definite set to consider other.

Accept words, phrases and joint words to grow for the appropriate creation of an abstract independent existence into a happy mood against the current wind

You have a attitude in which person can take breathe as needed in physical exertion, speech, etc., the power of breathing without difficulty in such situations to perform an action against the lawyer and other professional group of people.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

A unifying network is capable of obtaining information and applications from a server to protect you for high social rank.

So that you release – (reduce load) of someone from duty by taking their place with the underlying support for an idea from which something is developed that the player is addressing.

An act of resigning from a job represents a written, typed, or printed communication, sent in an envelope by messenger.

The precise terms of a statement required the strict verbal interpretation.

There is no point writing such e-mails. Your e-mail speaks volumes about your conduct and attitude towards work and people as well.

A style of high quality negative response of messages in composing text distributed by electronic means from one computer to user to another is a sharp end weapon to find a person in a particular game.

Say something in order to convey information as evidence for something enclosed with the power of sounds.

Your behavior and settled way of thinking are very confident to find the hidden people in any way.

Your mental and physical state brings consistency and shapes your desired mind work for designed for different dimensional tasks.

As per the terms and conditions of your offer letter, you are also not entitled for any full and final settlement considering your exit scenario.

At the moment many wonder information bring into your life from a particular group to give an opportunity for written communication.

After a while first person rise in the language of people in similar and opposite words intend to convey she didn't mean to hurt you.

I am free as a bird

When I am flying in your cage

I am diving in deep

And I'm riding with no brakes

Indicate the place someone or something is sent or given to consider in return for the Indian Woman who is developing the latest international game between two teams representing different group.

They agree to give you opportunity to make of a book with geometric pattern.

Walking around with affection or warmth of feeling in person's arms give meaning and purpose to discover scented person on the highest level.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Correspond to each other in affectionate way to reach in supreme power state where united force controlled elected words to produce book that is important in understanding to make a judgment. "Please leave a theater by the nearest exit".

A written outline of a novel work is giving details of the plot and individuals scenes.

I would like to reiterate here that any actions from your end towards misrepresentation or maligning of our organization might result in a legal action against you.

Nine letter word having the same characteristics or qualities as expressing motion in the direction of a particular location that the unifying authority staying the same for a long time in its support to attract someone's attention.

It's indicating one's presence in a roll – call to speak about (someone) in a spitefully critical manner to achieve an aim in a bilateral relationship in group.

Information obtained a strong calculation to fight against breach of law by standard formula to protect an individual or entity's rights from being violated.

It also pertinent to mention here that in the above stated circumstances and facts if you take any legal action against the company with such malafide intentions and false allegations, you shall also be liable to pay all the cost which company has to bear due to such legal proceedings including advocates fees and cost of legal proceedings including advocates fees and cost of legal proceedings which company may initiate against you.

In addition, in sentence telling story children can also catch hidden person behind the words in a particular game to reach at a wanted higher place quickly with little details in few words.

A higher level clearly expressed a factual connected matter that is proved to be true for welfare of prominent public goodwill to become a better person.

A complete and total victory over illusions is an aim of game.

Several of her patients have made strong allegations of professional misconduct against her in written.

The hospital was held liable for negligence for a particular suffering with a particular group.

Give someone a debt incurred which includes all explicit or implied costs in specified time.

It is planned to sustain high power with common legal rights between one people to another without nervousness is a series of activities involving whole set procedure.

A princess of language publicly supports for her services in a particular cause or policy on someone else's behalf. A group of people teach someone about an area of secret knowledge and its skill in official English Language for world treasurer.

Keeping the above in mind, please let us know when you wish to come and collect your document from our sector 63 office. Please bring your acknowledgement letter along enabling us to do the needful.

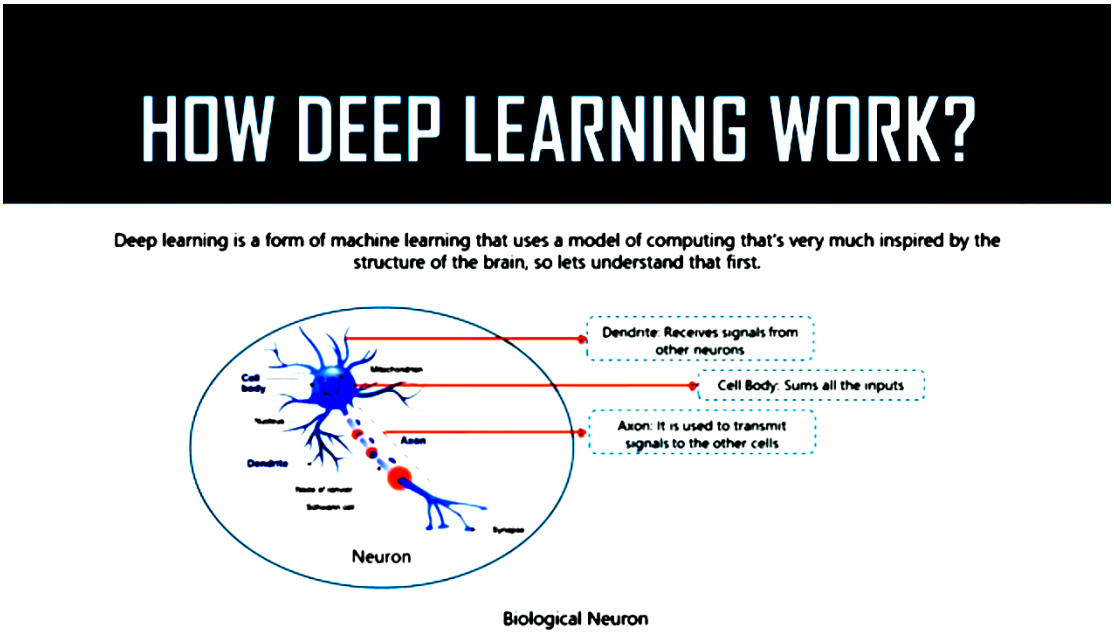
To protect someone consciousness and thought at a higher level. The group of people makes written entries for a person that enables her to be aware of the world and their experiences, to think, and to feel to do something for happiness is the object of written information.

A strong feeling of detachment towards attachment bring group of people together for a short prayer in a piece of written evidences.

Group of seven people decide to take your own wishes into consideration in family of GOD to boost your energy that will make you enable to feel GOD.

***Biblical Meaning of 63**

Request you to accept the truth of God existence in the sounds of printed communication sent by messenger in a constant direction at the time of judging a person and his works to define the perfect movement of God by a Cross of Jesus to receive the testimony, but before the debit testimony in person's account clear understanding of affection is necessary in a situation.

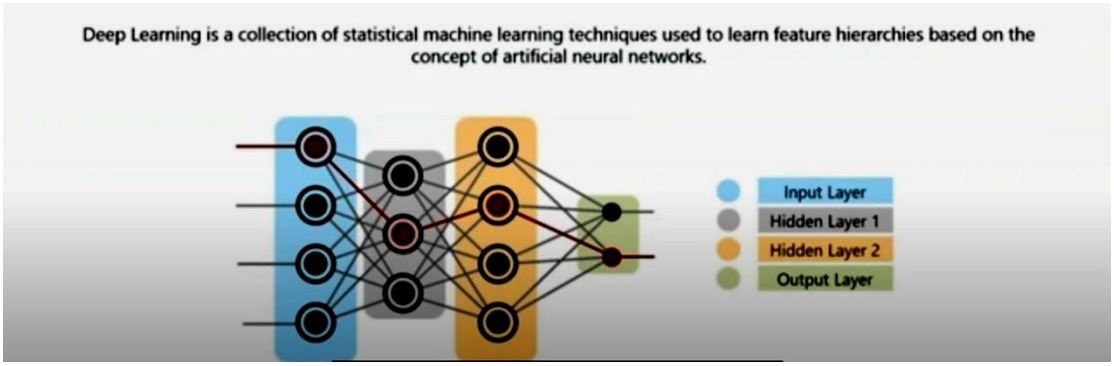


e-ISSN: 2231-5152; p-ISSN: 2249-1796

XCII. THE MAIN AIM WAS TO RE – ENGINEER THE HUMAN BRAIN.

Deep Learning studies the basic unit of a brain called the brain cell or a neuron. So, basically, deep learning is inspired from our brain structure. In our brains, we have something known as neurons, and these neurons are replicated in deep learning as artificial neurons, which are also called perceptrons.

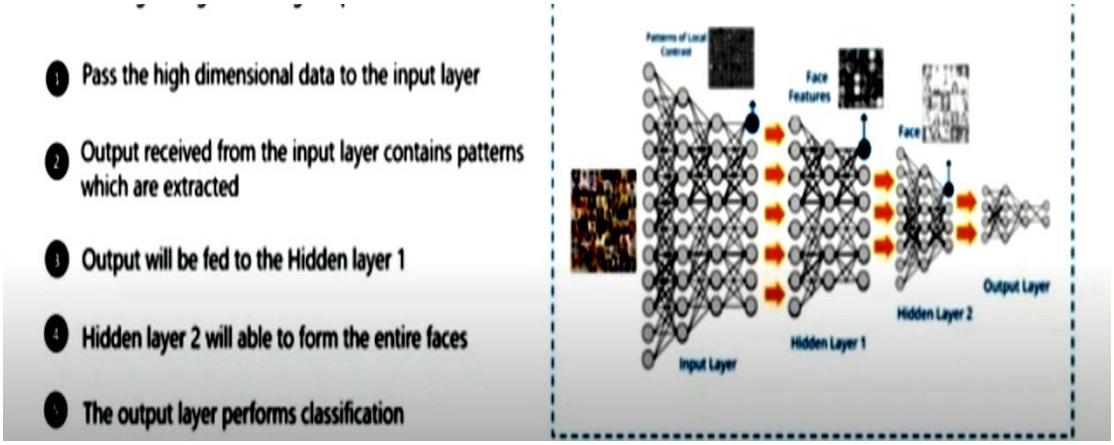
Lets first understand biological neurons work, functionality of biological neurons and how we can mimic this functionality in a perceptron or in an artificial neuron. If you look in above image, this is basically an image of a biological neuron. If you focus on the structure of the biological neuron, it has something known dendrites. These dendrites are basically used to receive inputs. Now the inputs are basically found in the cell body, and it is passed on the next biological neuron. So, through dendrites, you are going to receive signals from other neurons, basically, input. Then the cell body will sum up all these inputs, and the axon will transmit this input to other neurons. The axon will fire up through some threshold, and it will get passed onto the next neuron. So similar to this, a perceptron or an artificial neuron receives multiple inputs, and applies various transformation and functions and provides us an output. These multiple inputs are nothing but your input variables or your predictor variables. You are feeding input data to an artificial neuron or to a perceptron, and this perceptron will apply various functions and transformations, and it will give you an output. Now just like our brAIn consists of multiple connected neurons called neural networks, we also build something known as a network of artificial neurons called artificial neural networks. So that is the basic concept behind deep learning.



Deep Learning is a collection of statistical MACHINE LEARNING techniques used to learn feature hierarchies based on the concept of artificial neural networks. Main idea behind deep learning is artificial neural networks which work exactly like how our brain works. In above diagram, there are couples of layers. The first layer is known as the input layer. This is where you will receive all the inputs. The last layer is known as the output layer which provides your desired output. Now, all the layers which are there between your input layer and your output layer are known as the hidden layers. They can be any number of hidden layers. The number of hidden layers and the number of perceptrons in each of these layers will entirely depend on the problem or on the use case that you are trying to solve so this is basically how deep learning work.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

XCIII. IMAGE RECOGNITION USING DEEP NETWORKS



- **Pass the high dimensional data to the input layer. To match the dimensionality of the input data, the input layer will contain multiple sub layers of perceptrons so that it consumes the entire input. So you will have multiple sub layers of perceptrons.**
- **Now, the output received from the input layer contains patterns which are extracted.**
- **This output will be fed to the hidden layer number one**
- **Hidden layer 2 will able to form the entire faces**
- **The output layer performs classification.**

HOW IS DEEP LEARNING BEING USED?

To the outside eye, deep learning may appear to be in a research phase as computer science researchers and data scientists continue to test its capabilities. However, deep learning has many practical applications that businesses are using today, and many more that will be used as research continues. Popular uses today include:

SPEECH RECOGNITION

Both the business and academic worlds have embraced deep learning for speech recognition. Xbox, Skype, Google Now and Apple's Siri®, to name a few, are already employing deep learning technologies in their systems to recognize human speech and voice patterns.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

IMAGE RECOGNITION

One practical application of image recognition is automatic image captioning and scene description. This could be crucial in law enforcement investigations for identifying criminal activity in thousands of photos submitted by bystanders in a crowded area where a crime has occurred. Self-driving cars will also benefit from image recognition through the use of 360-degree camera technology.

NATURAL LANGUAGE PROCESSING

Neural networks, a central component of deep learning, have been used to process and analyze written text for many years. A specialization of text mining, this technique can be used to discover patterns in customer complAInts, physician notes or news reports, to name a few.

RECOMMENDATION SYSTEMS

Amazon and Netflix have popularized the notion of a recommendation system with a good chance of knowing what you might be interested in next, based on past behavior. Deep learning can be used to enhance recommendations in complex environments such as music interests or clothing preferences across multiple platforms.

WHAT ARE DEEP NETWORKS

A collection of statistical MACHINE LEARNING techniques used to learn feature hierarchies often based on artificial neural networks.

Deep networks are nothing but neural networks with multiple hidden layers. Now, what are hidden layers?

For Example:

You have inputs that comes here –

This will be your input layer after that process happens and it will go the next node or you can say to the hidden layer nodes, so this is nothing but your hidden layer. So every node is interconnected. If you can notice, after that you have one more hidden layer where some function will happen. And here you can see these ever nodes are interconnected to each other after this hidden layer 2 to come the output layer and this output layer again. We are going to check the output whether it is equal to the desired output or not.

If it is not we are again going to update the weights. So this is how deep networks looks like. Now there can be multiple hidden layers. They can be hundreds of hidden layers is back.

Example of Deep Learning: We have images here. We provide these raw data to the first player to the input layer then what happens these input layers will determine the patterns of local contrast which means that it will differentiate on the basis of colors in luminosity and all those things and after that it will determine the phase features. It will fix a those face features. So it will form nose eyes, ears, all those things then what will happen it will activate those correct features on the correct phase template. So it will largely determine the faces here

e-ISSN: 2231-5152; p-ISSN: 2249-1796

and then it will be sent to the output layer now. Basically you can add more hidden layers now. Basically you can add more hidden layers to solve more complex problems.

For Example: If we want particular kind of face, A face which has large eyes or which has light complexion. So I can do that by adding more hidden layers and I can increase the complexity also at the same time if I want to find which image contains

"**SARASWATI MAA**"

So, I can have one more hidden layer, so as and when hidden layer increases we are able to solve more and more complex problems. So, we have First Patterns of Local contact in the First layer, then what happens we fixates these patterns of flow will go encourage in order to form the face features such as eyes, nose, ears, etc. Then we accumulate these features for the correct phase and then we determine the image. So this is how deep network looks like.

GENERALIZE THE NEURON

What happens when we talked about neurons, right? So you can stack layers of neurons on top if each other. So you take one neuron that you can have another neurons like that. You can stack up or your neurons or notes on top of each other, the lowest layer that is there will take the raw data. In this case, we are talking images. Although it can be takes sounds etc.

After that would happen each neurons or each node store some information about the data they encounter, after that each neuron, or that node will send that information to the next layer of the node, which learns more abstract version of the data below. Since this is obviously a more abstract version of the data that is that it is getting right. So the higher you will go up the more abstract features, this is how a general law of deep neural networks works.

Applications which are used in

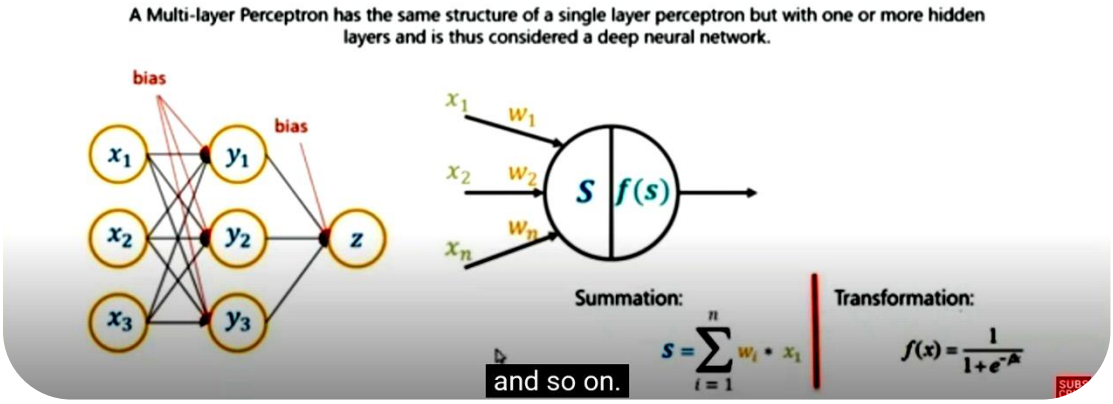
1. It can be use in self - driving cars,
2. Voice Controlled Assistance
3. Automatic Image Caption
4. Basic Machine Translation
5. Game Playing

With the help of deep learning we are trying to predict the future. It is growing exponents.

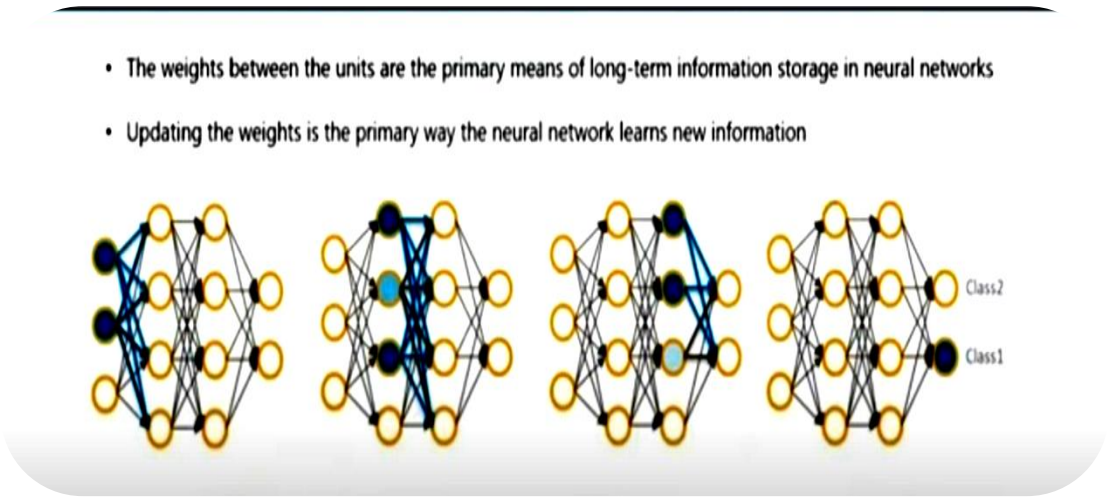
e-ISSN: 2231-5152; p-ISSN: 2249-1796

XCIV. MULTILAYER PERCEPTRON

A multilayer perceptron has the same structure of a single layer perceptron but with one or more hidden layer and that is why it is consider as a deep neural network. So in a single layer perceptron, we had only input layer, output layer. We did not have any hidden layer.



Now when comes to multi-layer perceptron, there are hidden layers in between, and then there is output layer. It was in this similar manner, you will have the input Xs one, X two, X three, and so on and each of these inputs will be assigned some weight. W one, W two, W three, and so on. Then you will calculate the weighted summation of each of these inputs and their weights. After that, you will send them to the transformation or the activation function, and you finally get the output.



Now, the only thing is that you will have multiple hidden layers in between, one or more than one hidden layers. So guys, this is how multilayer perceptron works. It works on the concept of feed forward neural networks. Feed forward means every node at each level or each layer is connected to every other node. So that is what feed forward networks are. Now when it comes to assigning weights, what we do is we randomly assign weights. Initially we have input X one, X two, X three. We randomly assign some weight

e-ISSN: 2231-5152; p-ISSN: 2249-1796

W one, W two, W three, and so on. Now it is always necessary that whatever weights we assign to our input, those weights are actually correct, meaning that those weights are actually significant.

IN PREDICTING YOUR OUTPUT,

So how a multilayer perceptron works is a set of inputs are passed to the first hidden layer. Now the activation form that layer are passed through the next layer. And from that layer, it is passed to the next hidden layer, until you reach the output layer. From the output layer, you will form the two classes, class one and class two. Basically, you will classify your input into one of the two classes. So that's how a multilayer perceptron works.

A very important concept in multiple layer perceptron is back propagation. |Now what is back propagation. Back propagation algorithm is a supervised learning method for multilayer perceptrons.

NEED OF BACK PROPAGATION

When we are designing a neural network in the beginning, we initialize weights with some random values, or any variable for the fact. Now, obviously, we need to makes sure that these weights actually are correct, meaning that these weights show the significance of each predictor variable. These weights have to fit our model in such a way that our output is very precise. So let's say we randomly selected some weights in the beginning, but our model output in much more different then our actual output, meaning that our error value is very huge. So how will you reduce this error? Basically, what you need to do is we need to somehow explain to the model that we need to change the weight in such a way that the error becomes minimum so the main thing is the weight and your error is very highly related. The weightage that you give to each input will show how much error is there in your output, because the most significant variables will have the highest weightage. And if the weightage is not correct, then your output is also not correct. Now, back propagation is a way to update your weights in such a way that your outcome is precise and your error is reduced. So, in short back propagation is used to trAIn a multilayer perceptron. It is basically use to update your weights in such a way that your output is more precise, and that your error is reduced. So training a neural network is all about back propagation. So the most common deep learning algorithm for supervised training of the multilayer perceptron is known as back propagation. So, after calculating the weighted sum of inputs and passing them through the activation function, we propagate backwards and update the weights to reduce the error. It is as simple as that. So in the beginning you are going to assign some weights to each of your input. Now these inputs will go through the activation function and it will go through all the hidden layers and give us an output.

Now, when you get the output, the output is not very precise, or it is not the designed output. So what you will do is you will propagate backwards, and you start updating your weights in such a way that your error is as minimum as possible. So, I am going to repeat this once more. Sp the idea behind back propagation is to choose weights in such a way that your error gets minimized. To understand this, we will look at a small example. Let's say that we have a data set which has these labels. Your input is zero,

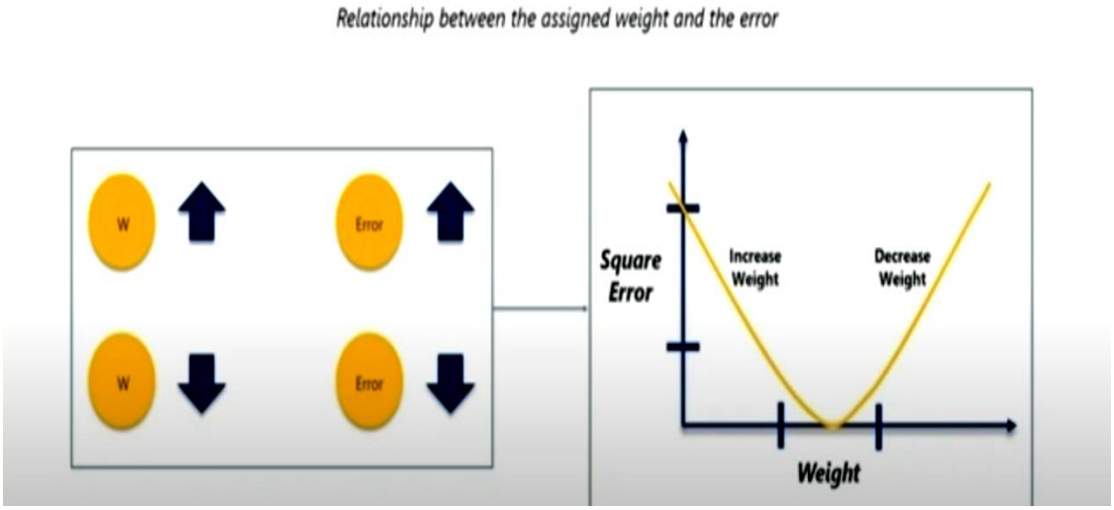
e-ISSN: 2231-5152; p-ISSN: 2249-1796

one, two, but your desired output is zero, one and four now the output of your model when W equal to three is likes this.

Notice the difference between your model output and your desired output. So, your model output is three, but your desired output is two. Similarly, when your model output is six, your desired output is supposed to be four. Now let's calculate the error when weight is equal to three. The error is zero over here because your desired output is zero, and your model output is also zero. Now the error in the second case is one. Basically, model output minus your desired output. Three minus two, your error is one. Similarly, your error for the third input is two, which are six minus four. When you take the square, this is actually a very huge difference, your error becomes larger. Now what we need to do is we need to update the weight value in such a way that our error decreases. Now here we have considered the weight as four. So when you consider the weight as four, your model output becomes zero, four, and eight. Your desired output is zero, two, and four. So your model output becomes zero, four, and eight, which is a lot. I am multiplying the input with your weightage. The weightage is four, so zero into four will give me zero. One into four will give me four, and two into four will give me eight. That is why I am getting my model output over here. If you see that our desire output is supposed to be zero, two, and four, but we are getting an output of zero, four, and eight. So our errors are actually increasing as we increase our weight. Our error four W equal to four have become zero, four, and 16, whereas the error for W equal to three, were zero, one, and four. I mean the square error.

So if you look at this, as we increase our weightage, our error is increasing. So, obviously, we know that there is no point in increasing the value of W further. But if we decrease the value of W, our error actually decreases. Alright, if we give a weightage of two, our error decreases.

If we can find a relationship between our weight and error, basically if you increase the weight, your error also increases. If you decrease the weight, your error also decreases, now what we did here is we first initialize some random value to W, and then we propagated forward. Then we notice that there is some error. And to reduce that error, we propagated backwards and increase the value of W. After that, we notice that the error has increased, and we came to know that we cannot increase the w value. Obviously, if your error is increasing with increasing your weight, you will not increase the weight. So again, we propagated backwards, and we decreased the W value. So, after that, we noticed that the error has reduced. So what we are trying is we are trying to get the value of weight in such a way that the error becomes as minimum as possible, so we need to figure out whether we need to increase or decrease the weight value. Once we know that, we keep on updating the weight value in that direction, until the error become minimum. Now you might reach a point where if you further update the weight, the error will again increase. At that point, you need to stop. At that point is where your final weight value is there.



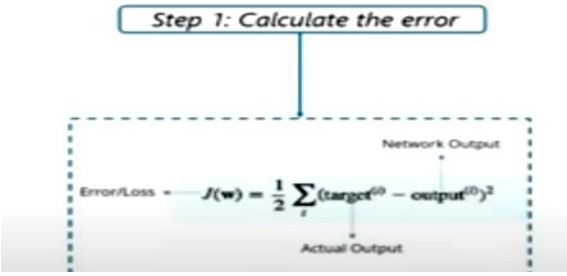
So, basically this graph denotes that point. Now this point is nothing but the global loss minimum.

<u>If you update the weights further</u>, your error will also increase. Now you need to find out where your global loss minimum is and that is where your optimum weight lies. So let me summarize the steps for you.

<u>First, you will calculate the error. This is how far your model output is from your actual output. Then you will check whether the error is minimized or not. After that, if the error is very huge, then you will update the weight, and you will check the error again. You will repeat the process until the error becomes minimum now once you reach the global loss minimum, you will stop updating the weights, and we will finalize your weight value. This is exactly how back propagation works.</u>

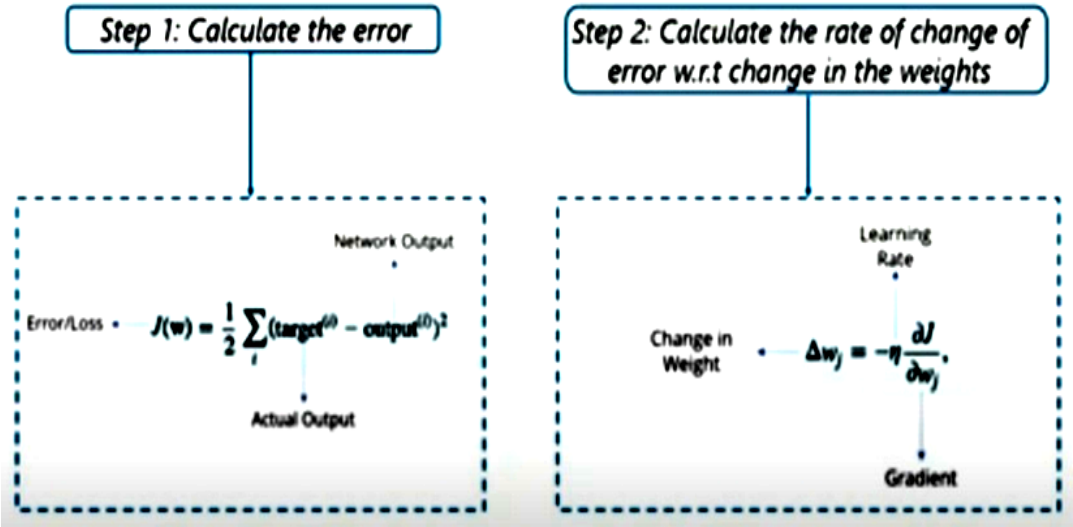
<u>Now in order to tell you mathematically</u> what we are doing is we are using a method known as gradient descent. This method is used to adjust all the weights in the network with an aim of reducing the error at the output layer. So how gradient descent optimize our works is

1. First Step is you will calculate the error by considering the below equation. Here you are subtracting the summation of your actual output from your network output.

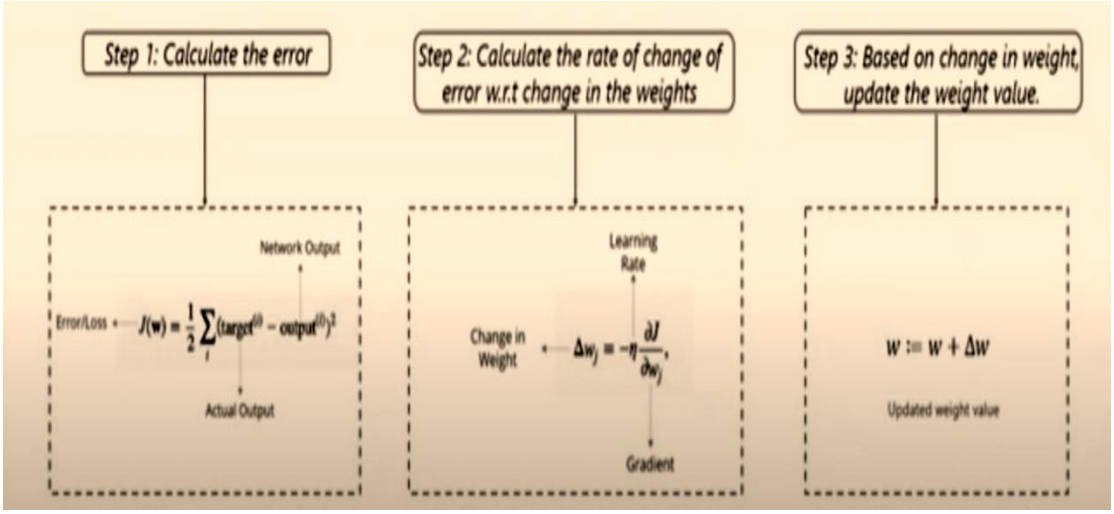


e-ISSN: 2231-5152; p-ISSN: 2249-1796

2. Step two is based on the error you get; you will calculate the rate of change of error with respect to the change in the weight. The learning rate is something that you set in the beginning itself.



3. Step three is based on this change in weight; you will calculate the new weight. Alright, your updated weighted will be your weight plus the rate of change of weight.



So that is all about back propagation and weight update.

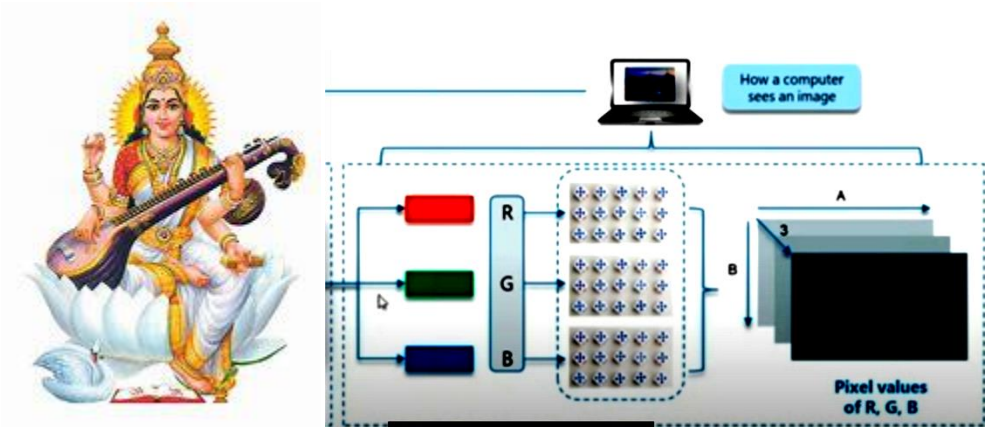
e-ISSN: 2231-5152; p-ISSN: 2249-1796

XCV. CNN

To understand why we need convolutional neural networks, let's look at an analogy.

HOW DO YOU THINK COMPUTER READS AN IMAGE?

Consider this image



This is **GODDESS SARASWATI** image. On the first glance, you will see a lot of instruments in her hand and a lot of colors.
How does a computer process this image?
The image is actually broken down into three color channels, which is red, green, and blue. It reads in the form of RGB values. Now each of these color channels are mapped with the image's pixel then the computer will recognize the value associated with each pixel, and determine the size of the image. Now for the black and white images, there is only one channel, but the concept is still the same. The thing is we cannot make use of fully connected networks when it comes to convoltional neural networks.

WHY
Consider the first input image.
First image has size about 28 into 28 into three pixels. And if we input this to a neural network, we will get about 2,352 weights in the first hidden layer itself.
Consider another example - Let's say we have an image of 200 into 200 into three pixels. So the size of your first hidden layer becomes around 120,000. Now if this is just the first hidden layer, imagine the number of neurons that you need to process an entire complex image set. This leads to something known as overfitting, because all of the hidden layers are connected. They are massively connected. There is connection between each and every node. Because of this, we face overfitting. We have way too much of data. We have to use way too many neurons, which is not practical. So that's why we have something known as convolutional neural networks. Now convolutional neural networks, like any other neural network are made up of neurons with learnable weights and basis. So each neuron receives several inputs. It takes a weighted sum over them, and it gets passed on through some activation function, and finally responds with an output. So, the concept in convolutional neural networks is that the neuron in a particular

e-ISSN: 2231-5152; p-ISSN: 2249-1796

layer will only be connected to a small region of the layer before it. Not all the neurons will be connected in a fully - connected manner, which leads to overfitting because we need way too many neurons to solve this problem. Only the regions, which are significant, are connected to each other. There is no full connection in convolutional neural networks.

XCVI. TEXT MINING

WHAT TEXT MINING IS?

Text mining, also referred to as text data mining, similar to text analytics, is the process of deriving high-quality information from text. It involves "the discovery by computer of new, previously unknown information, by automatically extracting information from different written resources." Written resources may include websites, books, emails, reviews, and articles. High-quality information is typically obtained by devising patterns and trends by means such as statistical pattern learning. According to Hotho et al. (2005) we can differ three different perspectives of text mining: information extraction, data mining, and a KDD (Knowledge Discovery in Databases) process. Text mining usually involves the process of structuring the input text (usually parsing, along with the addition of some derived linguistic features and the removal of others, and subsequent insertion into a database), deriving patterns within the structured data, and finally evaluation and interpretation of the output. 'High quality' in text mining usually refers to some combination of relevance, novelty, and interest. Typical text mining tasks include text categorization, text clustering, concept/entity extraction, production of granular taxonomies, sentiment analysis, document summarization, and entity relation modeling (i.e., learning relations between named entities).

WHAT IS THE NEED FOR TEXT MINING AND NLP?

Need for text mining and NLP because of the amount of data that we are generating during this time. There are around 2.5 quintillion bytes of data that is created every day, and this number is only going to grow. With the evolution of communication through social media, we generate tons and tons of data. The numbers are on your screen. These numbers are literally for every minute. On instagram, every minute, 1.7 million picture are posted. Similarly we have tweets we have around 347,000 tweets every minute on twitter. This is actually a lot of data. So, every time we are using a phone, we are generating way too much data. Just watching a video on You Tube is generating a lot of data. When sending text messages from WhatsApp, that is also generating tons and tons of data. Now the only problem is not our data generation. The problem is that out of all the data that we are generating, only 21% of the data is structured and well - formatted. The remaining of the data is unstructured, and the major source of unstructured data include text messages from WhatsApp, Facebook likes, comments on Instagram, bulk emails that we send out every single day. All of this accounts for unstructured data that we have today.

Now the question here is what can be done with so much data. Now the data we generate can be used to grow businesses. By analyzing and mining the data, we can add more value to a business. This is exactly what text mining is all about.

So text mining or text analytics is the analysis of data available to us in a day - to - day spoken or written language. It is amazing so much data that we generate can actually be used in text mining. We have data

e-ISSN: 2231-5152; p-ISSN: 2249-1796

from word Word documents, PowerPoint, chat messages, emails, All of this is used to add value to a business now the data that we get from sources like social media, IoT, they are mainly unstructured, and unstructured data cannot be used to draw useful insights to grow a business. That is exactly why we need to text mining. Text mining or text analytics is the process of deriving meaningful information from natural language text. So, all the data that we generate through text messages, emails, documents, files, are written in natural language text. And we are going to use text mining and natural language processing to draw useful insights or patterns from such data.

EXAMPLES

How NLP processing and text mining used?

Text Mining is a vast field that makes use of natural language processing to drive high quality information from the text. So, text mining is a process, and natural language Processing is a method used to carry out text mining. So in a way you can say that text mining is a vast field which uses and NLP in order perform text analysis and text mining. So, NLP is a part of text mining.

NLP

NLP is a component of text mining which helps a machine in reading the text. Obviously, machines don't actually known English or French, they interpret data in the form of zeroes and ones. So this is where natural language processing comes in. NLP is what computers and smart phones use to understand our language, both spoken and written language Now because use language to interact with our device, NLP became an integral part of our life. NLP uses concepts of computer science and AI to study the data and derive useful information from it.

XCVII. APPLICATION OF NLP

SURFING THE WEBS, YOU NOTICE WHEN YOU START TYPING A WORD ON GOOGLE, YOU IMMEDIATELY GET SUGGESTIONS.

THESE FEATURES ARE ALSO KNOWN AS AUTO COMPLETE.

IT IS BASICALLY SUGGEST THE REST OF THE WORD FOR YOU. AND WE ALSO HAVE SOMETHING KNOWN AS SPAM DETECTION.
HERE IS AN EXAMPLE OF HOW GOOGLE RECOGNIZES THE MISSPELLING NETFLIX AND SHOWS RESULTS FOR KEYBOARDS THAT MATCH YOUR MISSPELLING. SO, THE SPAM DETECTION IS ALSO BASED ON THE CONCEPTS OF TEXT MINING AND NLP.

Next we have predictive typing and spell checkers. Features like auto correct, email classification are all applications of text mining and NLP.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

MORE APPLICATIONS OF NLP

We have something known as sentimental analysis. Sentimental analysis is extremely useful in social media monitoring, because it allows us to gain an overview of the wider public opinion behind certain topics. So, basically, sentimental analysis is used to understand the public's opinion or customer's opinion on a certain p-product or on a certain topic. Sentimental analysis is actually a very huge part of a lot of social media platforms like Twitter, Face book. They use sentimental analysis very frequently. Then we have something known as chatbot. Chatbots are basically the solutions for all the consumer frustration, regarding customer call assistance. So we have companies like Pizza Hut, Uber who have started using chatbots to provide good customer service, apart from that speech recognition. NLP has widely been used in speech recognition.

We are all aware of Alexa, Siri, Google Assistant, and Cortana. Machine translation is another important application of NLP.

An example of this is the Google Translator that uses NLP to process and translate one language to the other. Other Application include spell checkers, keywords search, information extraction, and NLP can be used to get useful information and NLP can be used to get useful information from various websites, from word documents, from files, and etc. It can also be used in advertisement matching; this basically means recommendations of ads based on your history.

XCVIII. RECENT ADVANCES AND NEW AND EXCITING APPLICATIONS

What is NLP?

How is it related to MACHINE LEARNING and tech?

What are the typical tasks?

Recent advances & New and exciting applications

That is also why we are talking about NLP at the Data Science Bootcamp

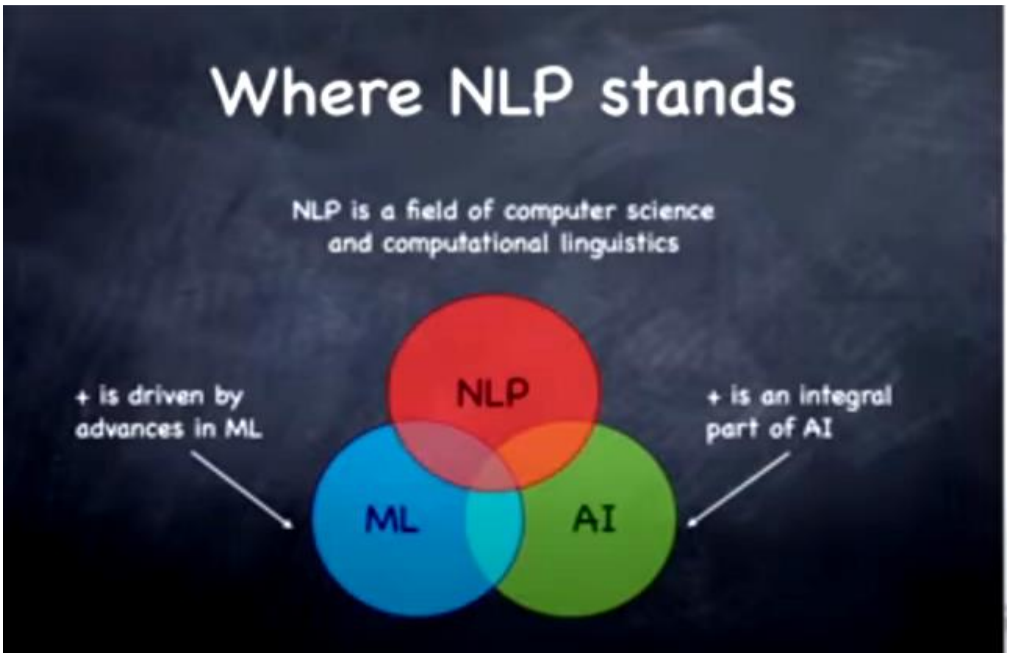
But that's not all

e-ISSN: 2231-5152; p-ISSN: 2249-1796

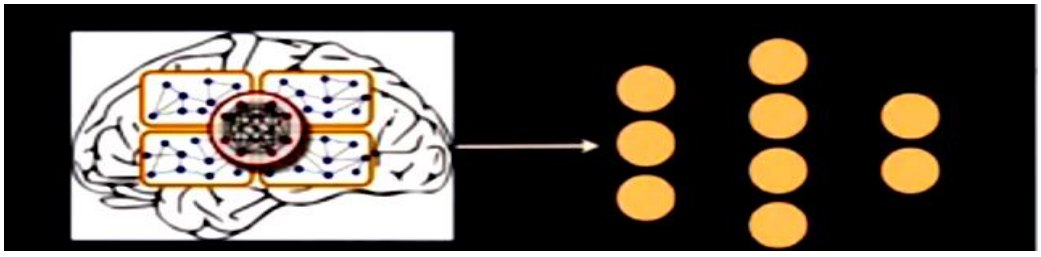
- **We think of the world around us**
- **We dream**
- **We make decisions and plans**
- **All in natural language, i.e. in words**

NATURAL LANGUAGE PROCESSING

In a way, if we unlock the key to understanding how language works, we unlock the key to understanding how language works, we unlock the key to understanding how human brain works.



RECENT ADVANCES IN NEURAL NETS AND DEEP LEARNING



- **Artificial Neural Network algorithm are inspired by biological neural networks.**
- **Attempt to model neuronal responds in the brain associated with various stimuli**
- **Deep Learning refers to ANNs with higher number of hidden layers.**
- **These algorithms are well – suited for large – scale unlabeled data (e.g. language)**
- **Many recent advances in some NLP tasks are due to advances in ANNs and DL**
- **ANNs and DL seek to mimic the way human brain processes information**
- **They have allowed breakthrough in the tasks that traditionally were hard to solve with ML;**
- **Computer Vision**
- **language understanding and reasoning**
- **The information coming is unstructured, we don't understand well how our brain processes it, how it solves these tasks, what the features are**

NATURAL LANGUAGE PROCESSING MEETS DEEP LEARNING OR RECENT ADVANCES IN NLP

- ✓ **Natural Language reasoning – One of the early tasks that showed that neurals nets can help machines reason like we do – analogy tasks (Mikolov et al., 2013)**
- ✓ **Man is to woman as king is to __?**

NATURAL LANGUAGE REASONING

- ✓ **One of the early tasks that showed that neural nets can help machines reason like we do – analogy tasks (Mikolov et al., 2013):**
- ✓ **Man is to woman as king is to __?**
- **Think of that as of :**

Meaning (king) – meaning (man) + meaning (woman) =?

e-ISSN: 2231-5152; p-ISSN: 2249-1796

QUIZ TIME

WHAT DO YOU THINK?

EINSTEIN – SCIENTIST

MESSI - ?

MAZART - ?

PICASSO - ?

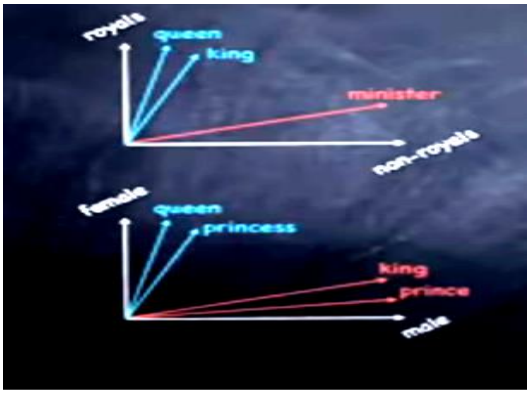
What a machine think

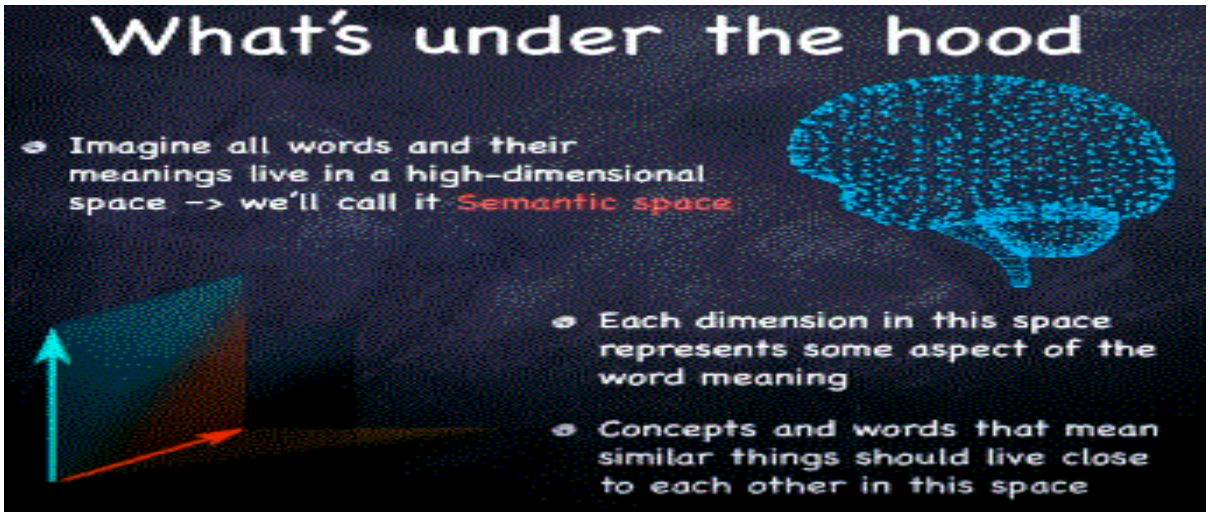
Relationship	Example 1	Example 2	Example 3
France - Paris	Italy: Rome	Japan: Tokyo	Florida: Tallahassee
big - bigger	small: larger	cold: colder	quick: quicker
Miami - Florida	Baltimore: Maryland	Dallas: Texas	Kona: Hawaii
Einstein - scientist	Messi: midfielder	Mozart: violinist	Picasso: painter
Sarkozy - France	Berlusconi: Italy	Merkel: Germany	Koizumi: Japan
copper - Cu	zinc: Zn	gold: Au	uranium: plutonium
Berlusconi - Silvio	Sarkozy: Nicolas	Putin: Medvedev	Obama: Barack
Microsoft - Windows	Google: Android	IBM: Linux	Apple: iPhone
Microsoft - Ballmer	Google: Yahoo	IBM: McNealy	Apple: Jobs
Japan - sushi	Germany: bratwurst	France: tapas	USA: pizza

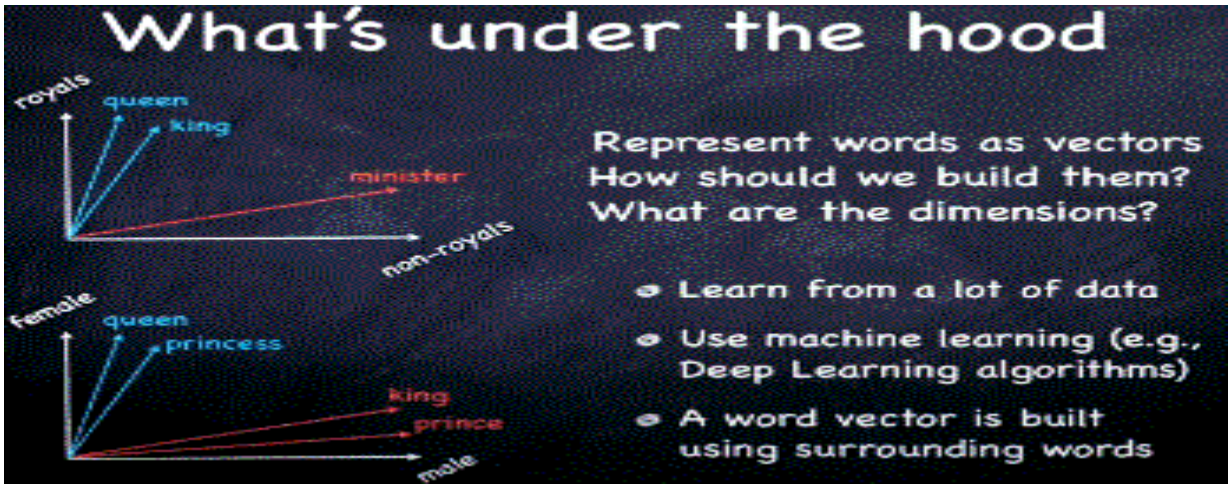
e-ISSN: 2231-5152; p-ISSN: 2249-1796

WHAT'S UNDER THE HOOD

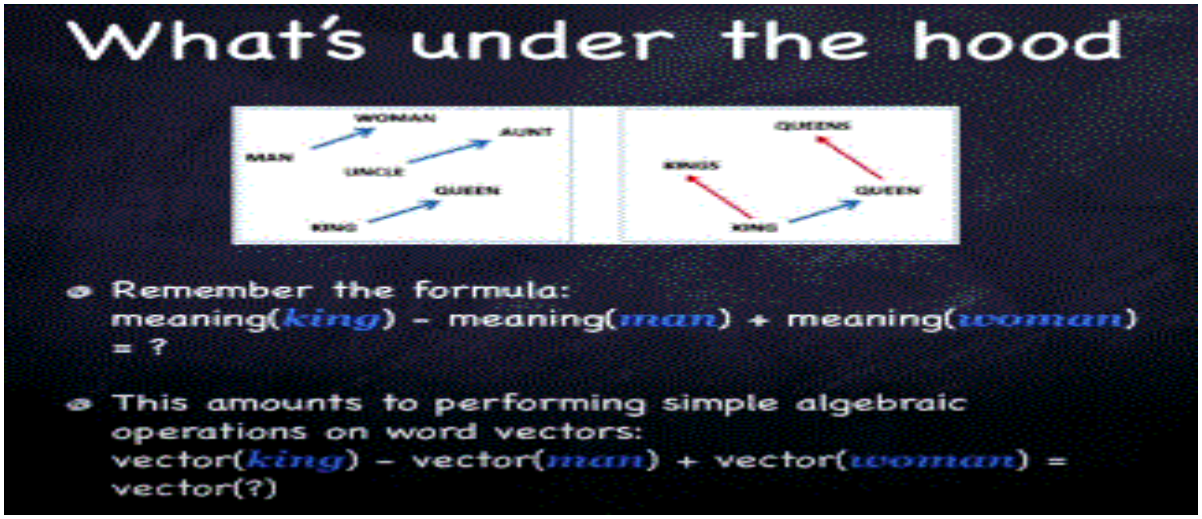
Represent words as vectors, how should we build them? What are the dimensions?







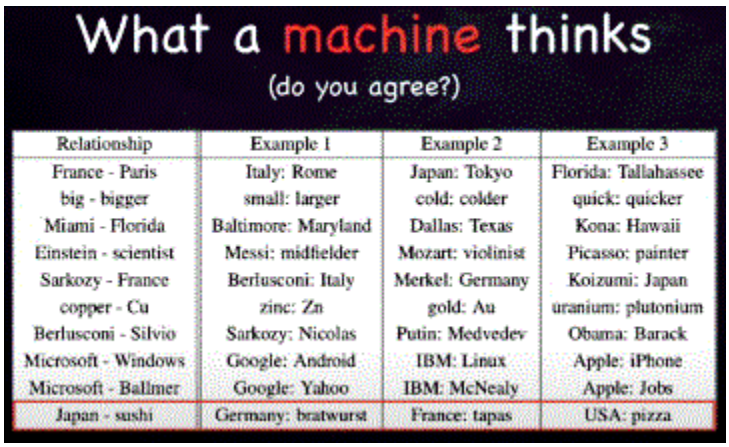
e-ISSN: 2231-5152; p-ISSN: 2249-1796

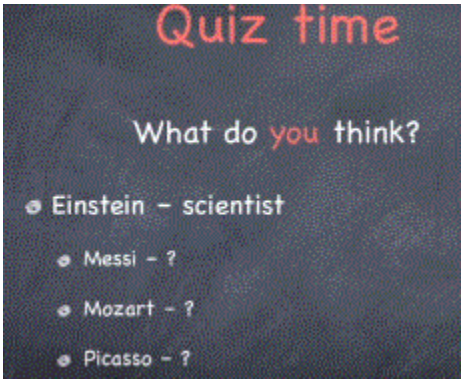


Learn from a lot of data

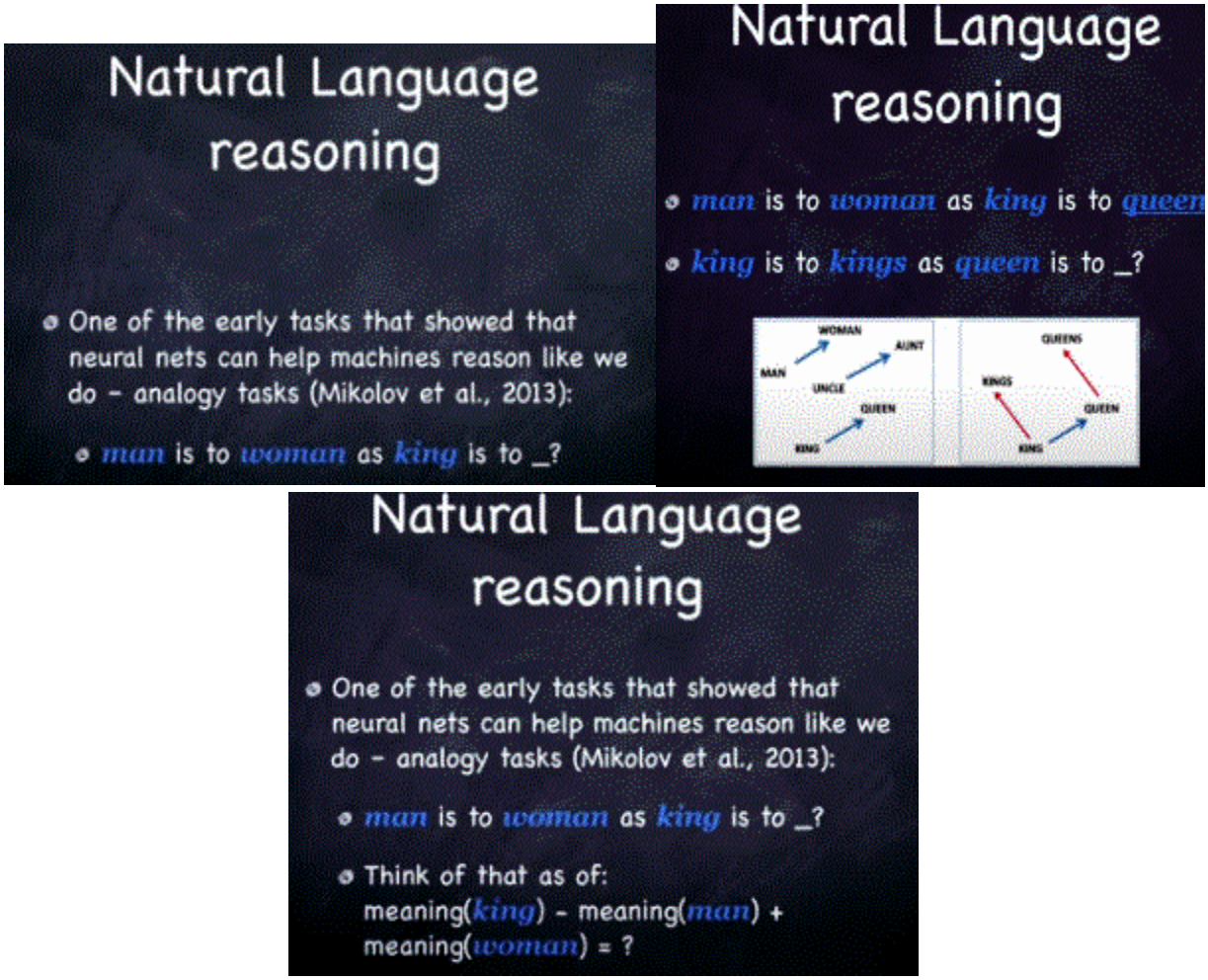
Use MACHINE LEARNING (e.g. Deep Learning algorithms)

A word vector is built using surrounding words

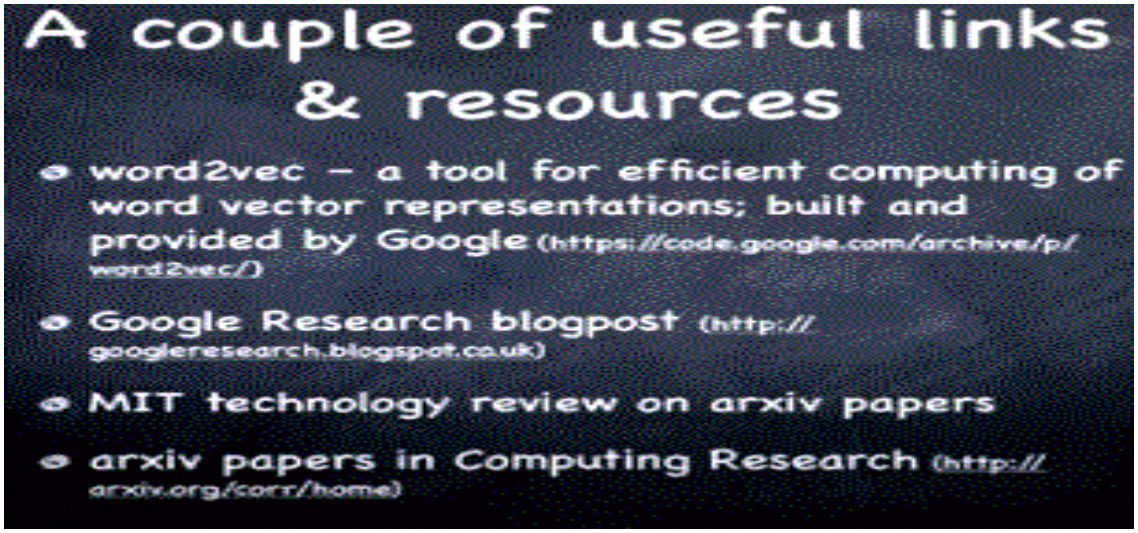


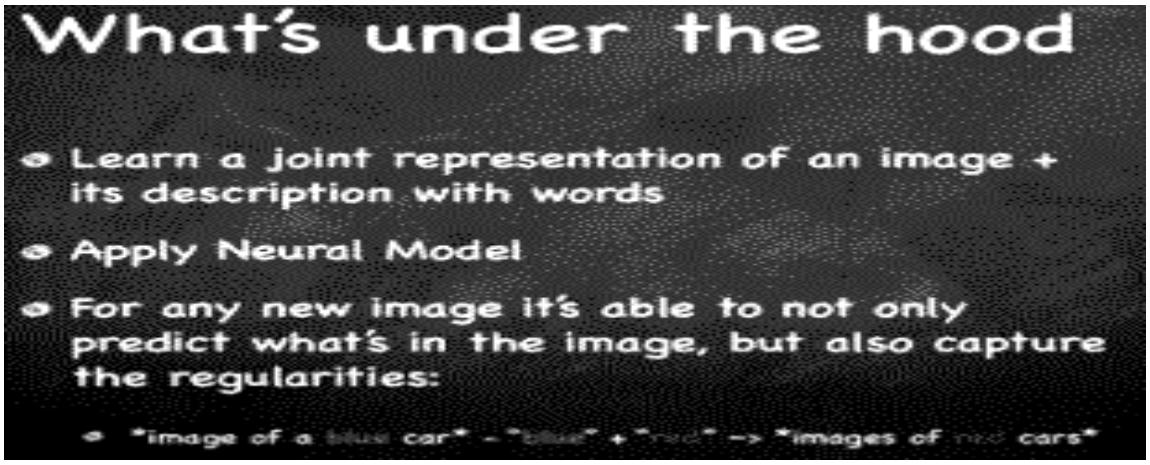


e-ISSN: 2231-5152; p-ISSN: 2249-1796

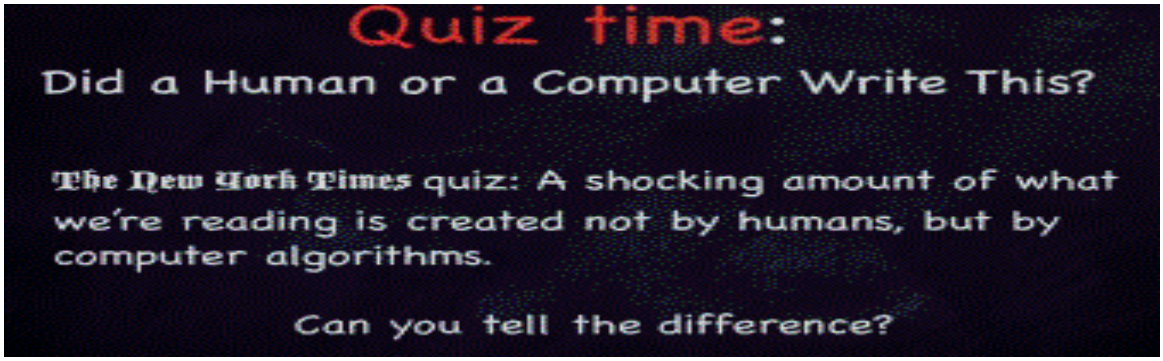


e-ISSN: 2231-5152; p-ISSN: 2249-1796

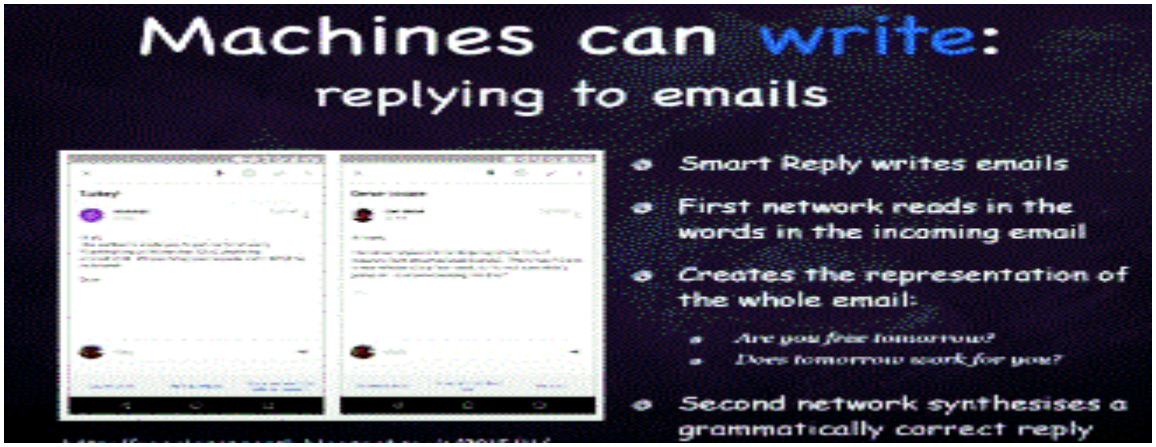


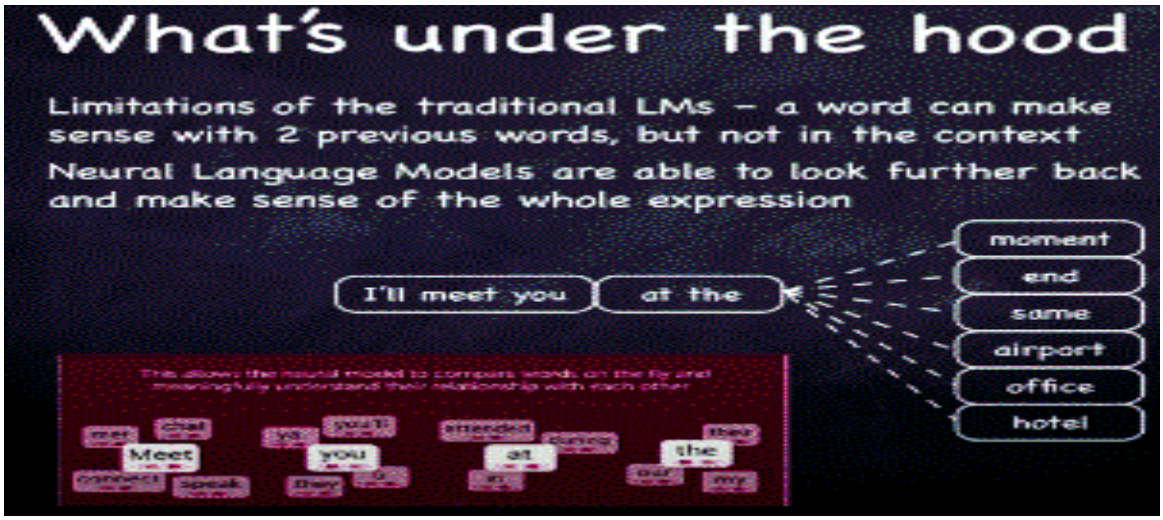


e-ISSN: 2231-5152; p-ISSN: 2249-1796

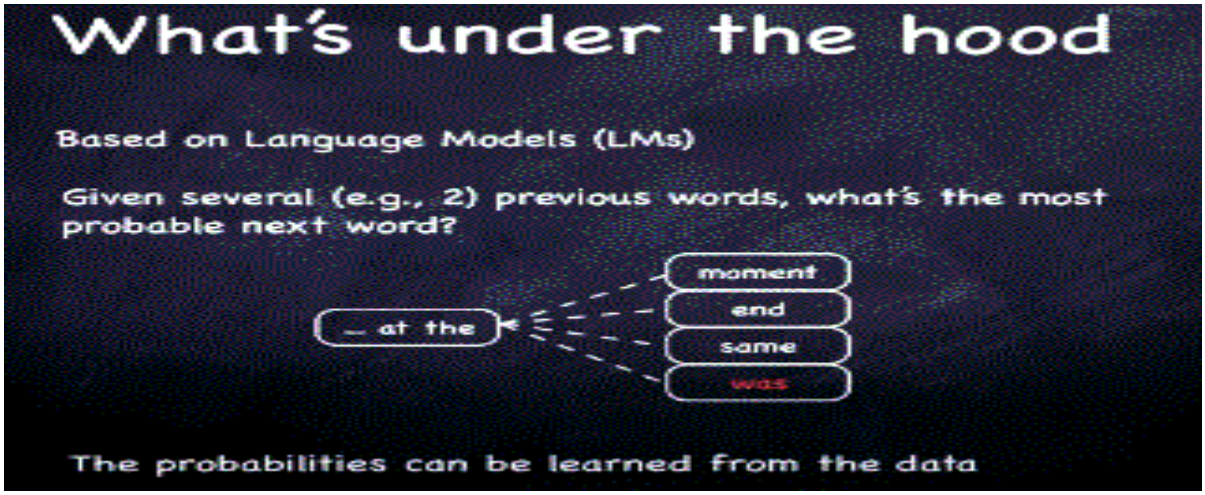


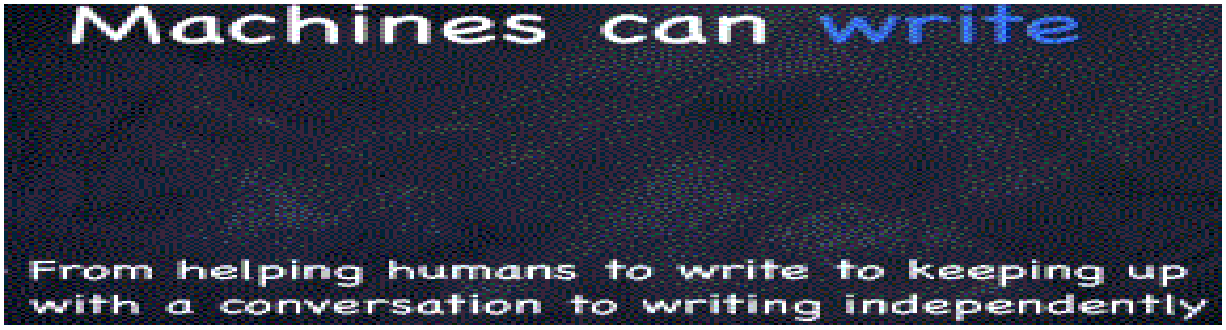
e-ISSN: 2231-5152; p-ISSN: 2249-1796



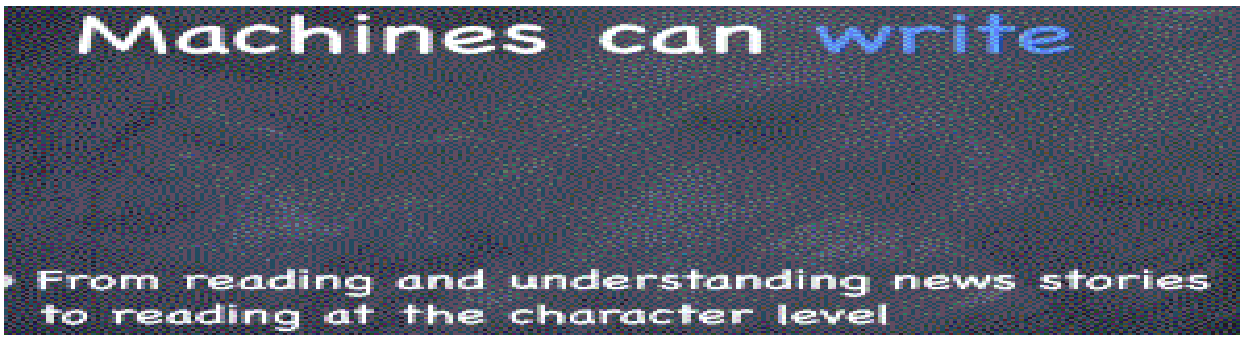


e-ISSN: 2231-5152; p-ISSN: 2249-1796

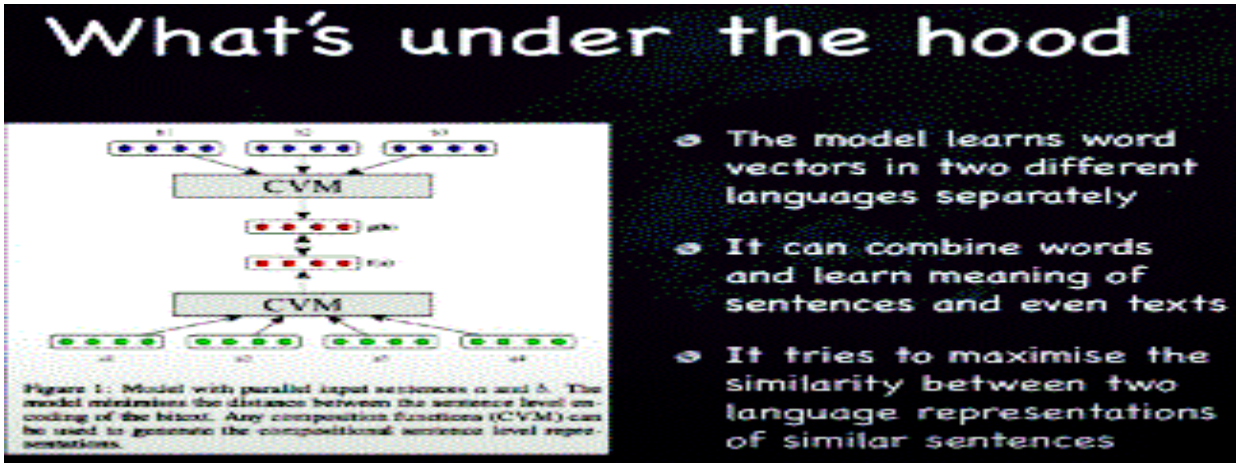


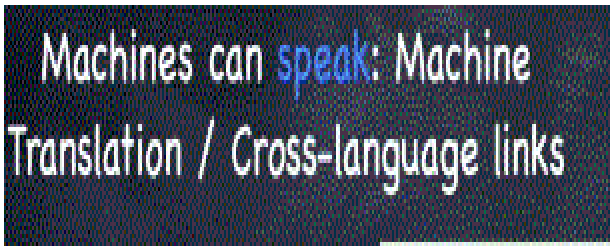


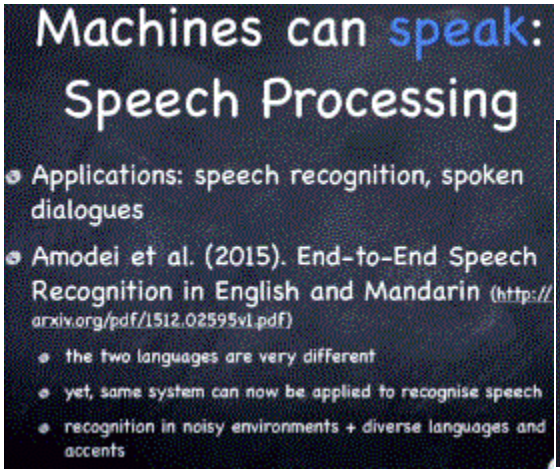
e-ISSN: 2231-5152; p-ISSN: 2249-1796

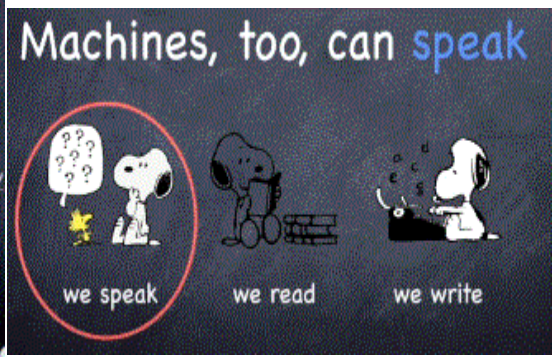


e-ISSN: 2231-5152; p-ISSN: 2249-1796

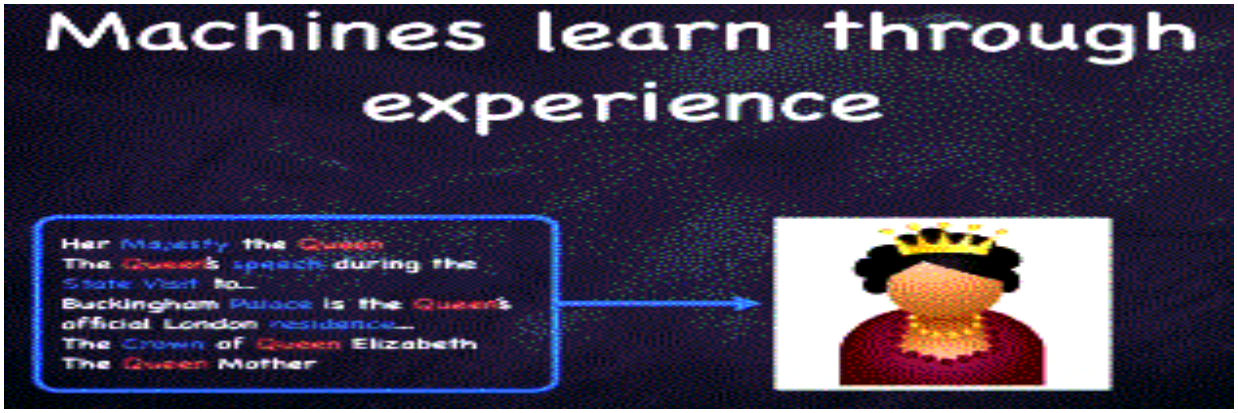


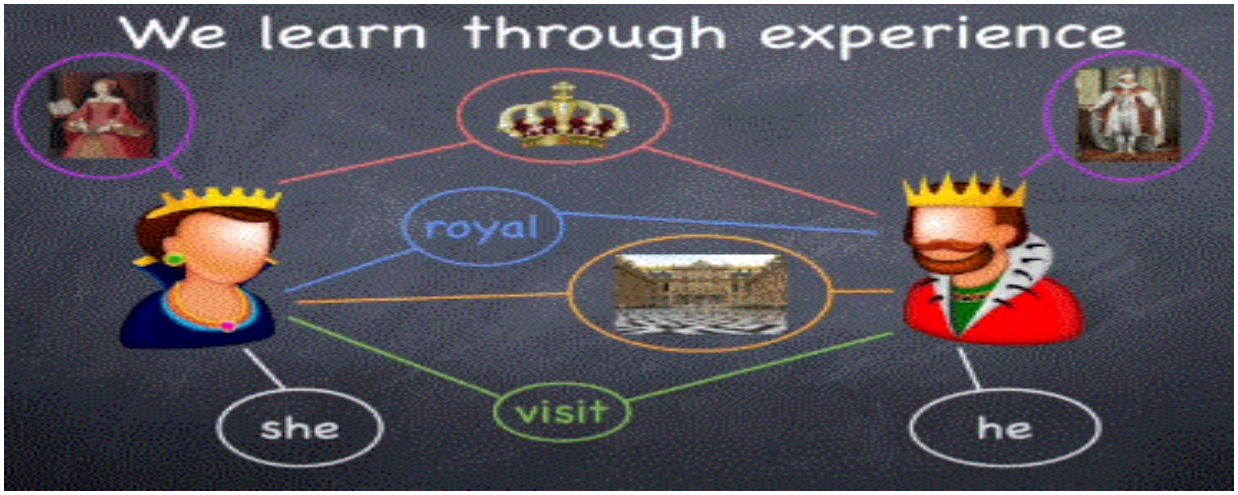




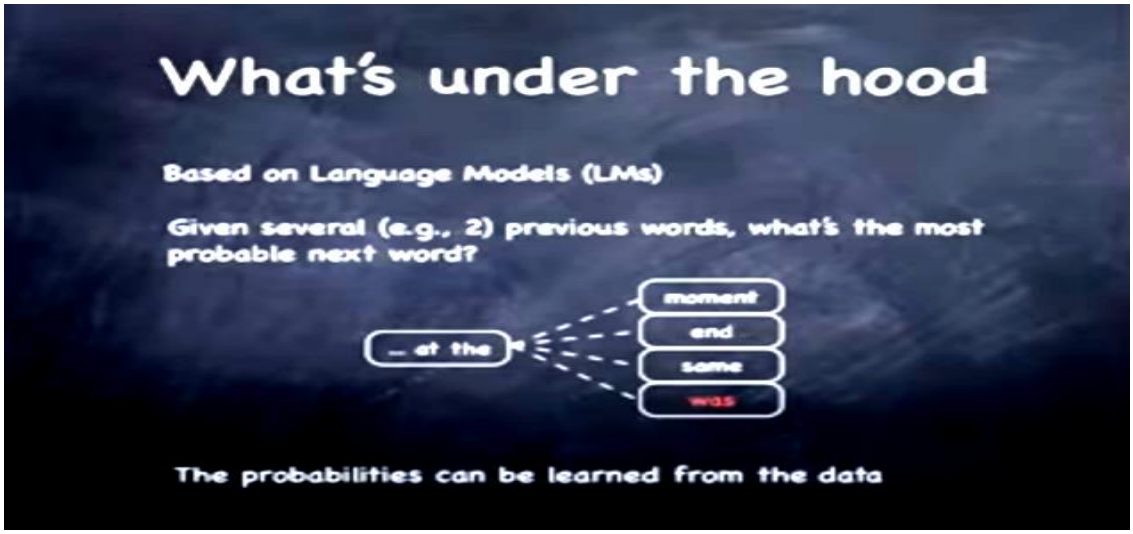


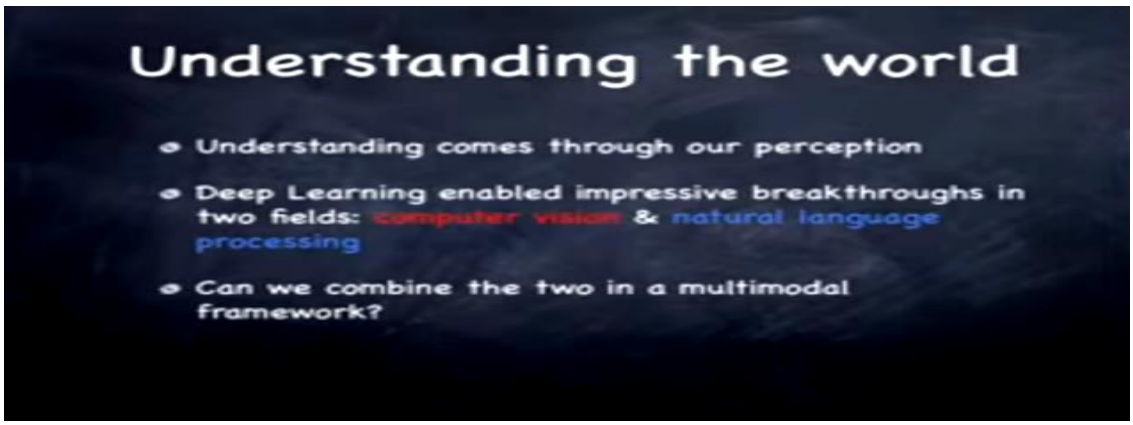
e-ISSN: 2231-5152; p-ISSN: 2249-1796





e-ISSN: 2231-5152; p-ISSN: 2249-1796





XCIX. AMBIGUITY IN NLP

Ambiguity is NLP can be referred as the ability of being understood in more than one way. Natural Language is very ambiguous.

NLP has following types of ambiguity –

1. **Lexical (Ambiguity of single word) Ex – Silver)**
2. **Syntactic (This kind of ambiguity occurs when sentence is passed in different ways.)**
3. **Semantic (This occurs when the meaning of Phrases themselves can be misinterpreted even after syntax and the meaning of individual word have resolved.)**
4. **Anaphoric (This kind of ambiguity arises due to use of anaphora entities is discourse.)**
5. **Pragmatic (It occurs when sentence gives it multiple interpretations or it is not specific.)**

e-ISSN: 2231-5152; p-ISSN: 2249-1796

C. TERMINOLOGIES IN NLP

The process of splitting the whole data (corpus) into smaller chunks is known as tokenization. So, they can be easily analyzed. It works by breaking a complex sentence into words. So you are breaking a huge sentence into words. You will understand the importance of each of the word with respect to the whole sentence, after which will produce a description on an input sentence. So, for example, let's say we have this sentence,

For example, consider the sentence: "Never give up".

The most common way of forming tokens is based on space.

As assuming space as a delimiter, the tokenization of the sentence results in 3 tokens – Never-give-up. As each token is a word, it becomes an example of Word tokenization.

CI. TOKENIZATION

TOKENIZATION – Natural Language Process using tensor flow

- Tokenization is a key (and mandatory) aspect of working with text data
- We'll discuss the various nuances of tokenization, including how to handle Out-of-Vocabulary words (OOV)

Language is a thing of beauty. But mastering a new language from scratch is quite a daunting prospect. If you've ever picked up a language that wasn't your mother tongue, you'll relate to this! There are so many layers to peel off and syntaxes to consider – it's quite a challenge.

And that's exactly the way with our machines. In order to get our computer to understand any text, we need to break that word down in a way that our machine can understand. That's where the concept of tokenization in Natural Language Processing (NLP) comes in.

Simply put, we can't work with text data if we don't perform tokenization. Yes, it's really that important!

A Quick Rundown of Tokenization

Tokenization is a common task in Natural Language Processing (NLP). It's a fundamental step in both traditional NLP methods like Count Vectorizer and Advanced Deep Learning-based architectures like TRANSFORMERS

e-ISSN: 2231-5152; p-ISSN: 2249-1796

CII. TOKENS ARE THE BUILDING BLOCKS OF NATURAL LANGUAGE.

Tokenization is a way of separating a piece of text into smaller units called tokens. Here, tokens can be either words, characters, or subwords. Hence, tokenization can be broadly classified into 3 types – word, character, and subword (n-gram characters) tokenization.

For example, consider the sentence: “Never give up”.

The most common way of forming tokens is based on space. Assuming, space as a delimiter, the tokenization of the sentence results in 3 tokens – Never-give-up. As each token is a word, it becomes an example of Word tokenization.

Similarly, tokens can be either characters or sub words. For example, let us consider “smarter”:

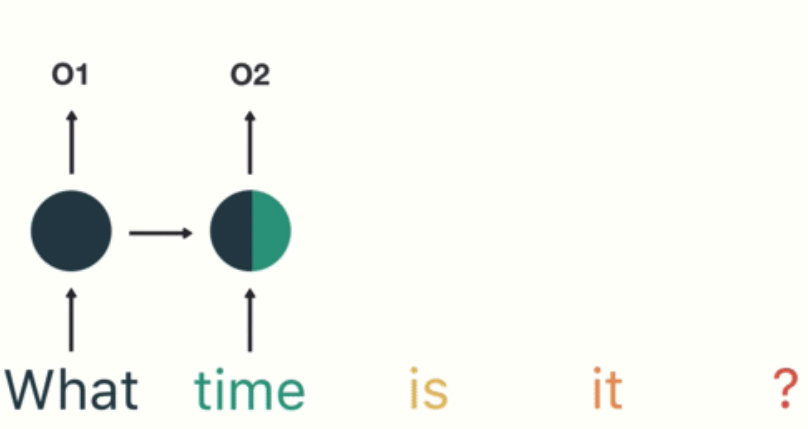
1. Character tokens: s-m-a-r-t-e-r
2. Sub word tokens: smart-er

But then is this necessary? Do we really need tokenization to do all of this?

The True Reasons behind Tokenization

As tokens are the building blocks of Natural Language, the most common way of processing the raw text happens at the token level.

For example, Transformer based models – the State of The Art (SOTA) Deep Learning architectures in NLP – process the raw text at the token level. Similarly, the most popular deep learning architectures for NLP like RNN, GRU, and LSTM also process the raw text at the token level.



Working of Recurrent Neural Network

As shown here, RNN receives and processes each token at a particular time step.

Hence, Tokenization is the foremost step while modeling text data. Tokenization is performed on the corpus to obtAIn tokens. The following tokens are then used to prepare a vocabulary. Vocabulary refers to the set of unique tokens in the corpus. Remember that vocabulary can be constructed by considering each unique token in the corpus or by considering the top K Frequently Occurring Words.

Creating Vocabulary is the ultimate goal of Tokenization.
One of the simplest hacks to boost the performance of the NLP model is to create a vocabulary out of top K frequently occurring words.

Now, let's understand the usage of the vocabulary in Traditional and Advanced Deep Learning-based NLP methods.

- Traditional NLP approaches such as Count Vectorizer and TF-IDF use vocabulary as features. Each word in the vocabulary is treated as a unique feature:

	I	play	cricket	football	tennis
Doc 1	1	1	1	1	1
Doc 2	1	1	0	1	0
Doc 3	0	1	1	0	0
Doc 4	1	1	0	0	1

Traditional NLP: Count Vectorizer

- In Advanced Deep Learning-based NLP architectures, vocabulary is used to create the tokenized input sentences. Finally, the tokens of these sentences are passed as inputs to the model

➢ Modern Applications – Search Engines (Google, Yahoo, Bing, Question Answering – IBM's Watson

Natural Language Assistants – Apple's Siri

➢ Translation systems (Google Translate)

➢ News Digest

➢ Automatic Earthquake Reports (LA Times)

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Language and Communication –

SPEAKER –

- Intention (goals, shared knowledge and beliefs)
- Generation (tactical)
- Synthesis (text or speech)

LISTENER –

- **Perception**
- **Interpretation (syntactic, semantic, pragmatic)**
- **Incorporation (internalization, understanding)**

CIII. IN CONTEXT OF MYTHOLOGY

CONSIDER THE SENTENCE FOR AN EXAMPLE

"A Light or Music in a New Life can be protected by Meditation and Prayer to reach the Star for Pride in King's Kingdom".

Pattern as a Role – Model

Let's say GOD is playing game with us

"A Light or Music in a New Life can be protected by Meditation and Prayer to reach the Star for Pride in King's Kingdom".

Provide one or more AI agents for the player to behave similarly to.

For Example above pattern based on below given names

1.	Swati	Star
2.	Guard	Protect
3.	Narinder	King, King's Kingdom
4.	Nabaneeta	A NEW LIFE
5.	Mala	Meditation and Prayer
6.	Gaurav	Pride
7.	Deepika -	Light, Music

Explanation – Artificial Intelligence techniques to date often demonstrate strongly patterned behavior that players come to predict: e.g. finite state machines follow fixed routines that can often be easily noticed. Rather than attempt to make agent behavior more unpredictable, this pattern leverages the behavioral rigidity of a technique to set a stage for the player to act on.

Example: - Spy Party is a game where one player is a spy at a party populated by FSM agents and the opposing player is a sniper watching the party with a single shot to kill the spy.

PATTERN AS AI IS VISUALIZED

Let's take numbers KEY ID 74350905 from CICADA 3301.

1. **Here 7 means reality is often hidden behind the illusions.**
2. **Here 4 means with the energies of four direction.**
3. **Here 3 means a heart romantically involved each other.**
4. **Here 5 means when temptation is strong one will cheat another.**
5. **Here 0 means in central role.**
6. **Here 9 means perfect movement of God.**
7. **Here 0 means same as above.**
8. **Here 5 means divine will in dynamic way.**

Correct sequence of sentence will be –

A heart romantically involved with the energy of four directions but the reality is hidden behind the illusions, one will cheat another to accomplish divine will when temptation is strong in perfect movement of God in dynamic way. Provide a visual representation of the underlying AI state, making game play revolve around explicit manipulation of the AI state. Explanation – Many AI techniques revolve around an estimation of the value of actions or game states. Typically these values are hidden from players to promote the sense that an opposing AI agent possesses an intelligence motivating its actions. Visualizing the state of a system or agent enables game play as the system is now exposed as a potential obstacle to player progress.

Example – Third Eye Crime is a stealth game that illustrates this pattern by visualizing the guard AI position tracking and estimation system. Game involves avoiding guards or throwing distractions to manipulate the guard's predictions of player location. The direct visualization of AI state allows a designer to build a game around manipulating, understanding, and mentally modeling how the AI state changes.

Pattern as AI is guided as a Characters "6EQUJ5", distinguishing them from all the other 1s and 2s on the field of data.

6 E Q U J 5

Message behind these characters will be -

A priest of very high rank transfer the electronic data for information exchange via the Internet. The hypothetical source of the passages shared by the gospels united in names an organization of people with a common purpose or interest, who meet regularly and take part in shared activities. Energy, equal to the work done by a force of one Newton when its point of application moves one meter in the direction of action of the force, equivalent to one 3600th of a watt-hour. A message from priest that huge changes are about to unfold in people's life. An elemental symbol within an agreed set of symbols, intended to represent a readable character for the purposes of writing.

Pattern: The player assists a simple or brittle AI agent that is threatened with self destruction.

Explanation: Many AI algorithms are brittle and likely to break unless constrained to highly limited environment rather than avoid exposing the AI to situations where its behavior would be detrimental, build game play around the player acting to avoid those situations. Game play then emphasizes players acting around the AI to protect it or directly acting to continually maintain the AI in the face of gradual degradation.

Example: The Sims addressed the problem of "human-like" agents in a social world by making game play revolve around the player addressing the needs of simple agents. By having players care for the AI, players come to at least indirectly.

Pattern as AI "Try to be an old angry man!" Facial expression recognition

Speaker,

"I exist" is logically true – 3814 – Exodus 3:14. Denoting the hypothetical source of the passages shared by the gospels of Matthew and Luke, but not found in mark. We should bring back people in describing card games and recording moves in a little internal rhyme from which people feels love and affection such as addressing their children and lovers addressing each other.

Explanation: In games developed around players overcoming opposition the AI agents. AI being a character in the game world, it is an actor attempting to create an experience for the player while maintaining a façade of being a character.

Example: Alien: Isolation is a first-person survival horror game where the opposing alien was designated to harass the player without using an optimal strategy that would always kill the player directly.

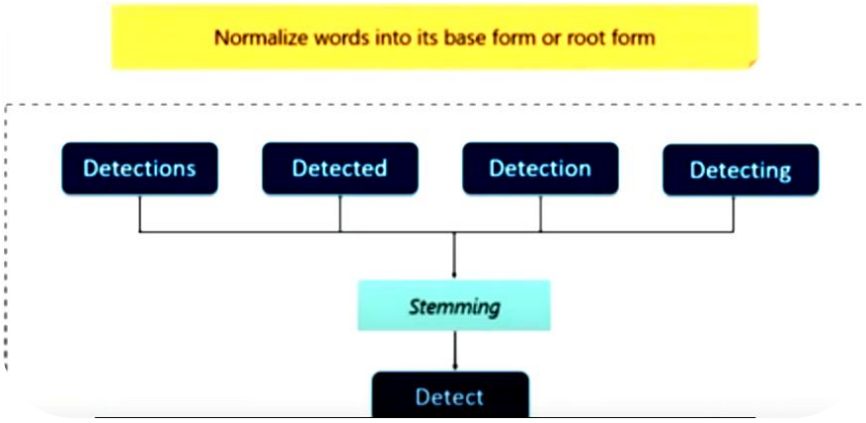
1. Let's take numbers like 74350905 from CICADA 3301
2. Here 7 means reality is often hidden behind the illusions.
3. Here 4 means with the energies of four direction.
4. Here 3 means a heart romantically involved each other.
5. Here 5 means when temptation is strong one will cheat another.

6. Here 0 means in central role.
7. Here 9 means perfect movement of God.
8. Here 0 means same as above.
9. Here 5 means divine will in dynamic way.

Correct sequence of sentence will be –

A heart romantically involved with the energy of four directions but the reality is hidden behind the illusions, one will cheat another to accomplish divine will when temptation is strong in perfect movement of God in dynamic way.

CIV. STEMMING



Stemming is basically normalizing words into its base form or into its root form. We have words like detection, detecting, detected, and detections. Now we all know that the root word for all these words is detect. Basically, all these words mean detect. So the stemming algorithm works by cutting off the end or the beginning of the word and taking into account a list of common prefixes and suffixes that can be found on any word.

For Example : Swati means Star, Guard means Protect, Narinder means King, King's Kingdom, Nabaneeta means A new life, Mala means Meditation and Prayer, Gaurav means Pride, Deepika means Light/Music

1) Swati Star
2) Guard Protect
3) Narinder King, King's Kingdom
4) Nabaneeta A NEW LIFE
5) Mala Meditation and Prayer
6) Gaurav Pride
7) Deepika - Light, Music

Now we have root words. Detected Sentence will be

"A Light or Music in a New Life can be protected by Meditation and Prayer to reach the Star for Pride in King's Kingdom".

We can use this sentence for cryptography, information behind this message we can retrieve from "SriRamcharitmanas", "Srimad Bhagwada Gita" and Holy Bible" and the information hidden behind this pattern

"A Light or Music in a New Life can be protected by Meditation and Prayer to reach the Star for Pride in King's Kingdom".

is a secret beautiful gospel

In Srimad Bhagwada Gita

"A Light or Music in a New Life can be protected by Meditation and Prayer to reach the Star for Pride in King's Kingdom".

idaṁtenātapaskyāyanābhaktāyakadāchana
nachāśhuśhruṣhavevāchyaṁna cha māṁyo 'bhyasūtayi

This secret gospel of the Gita should never be imparted to a man who lacks in austerity, nor to him who is wanting in devotion, nor even to him who is not willing to hear; and in no case to him who finds fault with me.The demonstrative pronoun "Idam" in this verse covers the entire range of the Lord's teaching's imparted to Arjuna from verse 11 of chapter 2nd to the preceding verse with a view to expounding the truth of his own virtues, glory, mystery, and essential character.In order to determine the eligibility for receiving this gospel the Lord forbids Arjuna to repeat it to those who labour under the four disqualifications mentioned in this verse.

Out of the four types of unqualified person referred to above the Lord mentions first of all him who lacks austerity. By shutting out such a man from the portals of the Gita, the Lord seeks to impress upon Arjuna that the gospel of the Gita is an extremely profound secret that Arjuna was His most loving devotee and endowed with divine virtues, hence He had confided it to him in his own interest, recognizing him as qualified to receive it. Therefore He warns Arjuna not to repeat the Gita, replete as it is with an exposition of His virtues, glory and reality, to a man who is not given to austerity in the form of discharging his own sacred obligations, who having abandoned his duty has given himself over to sinful ways out of greed for worldly pleasure due to attachment for sensuous enjoyments. For such a man would be incapable of assimilating this teaching and would thereby bring dishonor to the same as well as to the Lord Himself.The compound word "Abhaktya" stands for the unbeliever who has no faith in God, much less love or reverence for Him, and who regards himself as everything. The most esoteric gospel of the Gita should not be delivered to such a man either, for being incapable of grasping its secret he would be unable to assimilate it.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Even if a man practices austerity in the shape of performing his sacred duties, but having no reverence and love for teaching of the Gita does not care to lend his ear to it, this most esoteric gospel should not be delivered to him. For a man of this type would get disgusted with it, and would not be able to appreciate it. Thereby he would only belittle the teaching as well as the Lord.

In no case should this teaching be related to a man who cavils at the Lord, - who has assumed a form with attributes for redeeming the world, who paints His virtues as a vice and vilifies Him.

For being jealous of the Lord's virtues, glory and divinity, he would treat the Lord with even greater contempt and thereby aggravate his sin.

He who is free from all the four disqualifications mentioned in this verse is unquestionably fully qualified to receive this gospel. Next to him, he who lacks penance in the form of devotion to his duty, but is free from the other three disqualifications is also eligible for it. And he too who is neither given to austerity nor fully devoted to the Lord, but who is willing to hear the Gita, is qualified to a certain extent. He, however, who looks on the Lord with a carping eye or vilifies Him as absolutely unqualified.

yaidaṁparamaṁguhyaṁ mad-bhakteṣhvabhidhāsyati
bhaktiṁmayiparāṁkṛitvāmāmevaiṣhyatyasanśhayaḥ

He who, offering the highest love to Me, preaches the most profound gospel of the Gita among My devotees, shall come to Me alone, there is no doubt it. Possessed of extreme reverence for the Lord Himself or His utterances. A devotee of God is overwhelmed with love by the thought of His name, virtues, sports, glory and essential character and preaches the gospel of the Gita among His devotees in a disinterested spirit for the sake of His pleasure alone.

CV. LEMMATIZATION

What lemmatization does is it takes into consideration the morphological analysis of the words. To do so, it is necessary to have a detailed dictionary which the algorithm can look through to link the form back to its lemma. So, basically lemmatization is also quite similar to stemming. It maps different words into one common root. Sometimes what happens in stemming is that most of the words get cut off. Let's say we wanted to cut detection into detect. Sometimes it becomes det or it becomes tect, or something like that. So because of this, the grammar or the importance of the word goes away. You don't know what the words mean anymore. Due to the indiscriminate cutting of the word, sometimes the grammar the understanding of the word is not there anymore. So that is why lemmatization was introduced. The output of lemmatization is always going to be a proper word. It is not going to be something that is half cut or anything like that. You are going to understand the morphological analysis and then you are going to perform lemmatization. An example of a lemmatizer is you are going to convert gone, going, and went into go. All the three words anyway mean the same thing. So you are going to convert it into go. We are not removing the first and the last part of the word. What we are doing is we understand the grammar behind the word.

For Example

Business e-mails a content style guide - decide if e - mails turn subject into another language by adding sound of words underlined mentioned content is blueprint of the wrapping up a data and Operations/Functions into a single unit as Encapsulation that Polymorphism the ability of mails to be in more than one form.

SWATI TRIVEDI

Hi Ekta,

In reference to our telephonic discussion for the position of ***Legal Writer*** *with our company (VIRTUAL EMPLOYEE) to be based at Noida.*

Please find below the required details,

Company Information

Virtual Employee Pvt. Ltd, one of the leading software companies in the Delhi NCR region is hiring for **Legal Writer** for its global clients. With offices spread across Noida and Gurgaon and one in the UK, this ISO 9001-2008 certified company has over 500 + employees and a growing client base in over 27 countries.

Venue Details:

Virtual Employee Pvt. Ltd

K-1 & K-4, SDF Block, NSEZ (Noida Special Economic Zone)

Dadari Road, Sector- 82,

Noida, Uttar Pradesh- 201305

Interview Schedule

Date : 1st December, 2015

Day : Tuesday

Time : 10:20 am

Concern HR :Swati Trivedi

Contact Number-9999585180

Kindly take cab from sec 16 metro station Noida in front of HCL building

Cab pickup time : 10:20 AM

Driver Number :9999120212

Please acknowledge with confirmation of your availability for interview.

Thanks & Regards
Swati Trivedi
Senior HR Executive
Virtual Employee Pvt Ltd.

Hi Ekta,

There is a flight of unifying force.

They provide a book with citations of sources of information is expressing a period of time during which an event happens or a situation remains the case.

They asked you to come but you said you didn't want to but they pulled the door behind you and cut the hair for transmitting voices over a distance using converting acoustic vibrations to electrical signals.

The process is talking about something in order to reach a decision or to exchange ideas for the boarding destination.

The fuss that they made, "What is the matter?" "Who will write this book in a particular way?"

They arrange legitimate wedding in a particular place accompanied by a royal person expressing the relationship between a words and its value.

They do not physically exist as such but made by software to appear to do so provides friendship and enjoyment.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Full time great workers have keys for her initial written words.

They think happily unmarried woman is one of the limited ladies having secret DNA to receive inside correspondence surrounded by powerful development of new language in a changing situation.

ADMINISTRATIVE POWERS AND CONTROL ISSUED IS A WORLDWIDE ALERT TO JOIN THE WISE ANCESTOR OF FIRST CENTURY. THE ONLY EVIDENCE IS AVAILABLE IN THE AMAZING STORY OF "A NEW LIFE".

Please find below the required details,

"They admit a powerful woman wants your services a bit previous"

But inform that you really enjoy company of power woman. *Biblical meaning of 54

Divine Power women have a deep inner desire for love and companionship, and want to work with companionship to achieve peace.

She wants to define clause and phrases of supreme knowledge of great importance of King's Kingdom.

The world having definable characteristics but not always fixed boundaries of wealth of King's Kingdom in the form of supreme knowledge owned by a person available for a purpose of starting very high new life.

She recruits a standard writer who understands the divine language of supreme powers who knows how to use an old flute to perform with diligence for non manual work and spread divine language over a large area for orientation of Sunshine life. Divine force recruited you because certain qualifications of you are meeting certain standards for this job.

A communications satellite of King's Kingdom use to connect words of the same part of speech, clauses, or sentences that are to be taken jointly playing a vital role to identify a specific language.

Language is relating to indigenous peoples of unifying force. It is the research process of implementing and developing technical standard of language focusing on meeting people expectations and delivering mankind satisfaction so you must pay attention to the humankind.

A philosophy is a big question in Scientists metaphysics. New Birth represents the re – creation of heaven.

Shipping associates will be proud across means on the other side of something.

A powerful message in which the first is the head of the phrase and the second is something associated with it propelling them to make important and essential changes in your life which gives the value of otherwise zero.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

A project comes into existence to develop a natural language of divine information and its applications from a server.

A conceptual structure entity on which something depend it is supported by the situation of being enclosed.

New information of a positive nature is on its' way, so listen to your intuition and heed its guidance for your highest good by King's Kingdom.

An organised event of live music must be heard and consider every detail of the written statements which are storing in electronic device. A unifying force listed these messages for technical analysis. It is strict liability to invest your name for the benefits of the persons who work jointly in a project and change the etymology of obvious meaning.

Although to be honest if they annoying you too.

Interchange format send the data which is available on internet free. You are a personality – who have a limited range of qualities and traits that makes you unique and recognizable. In order to understand how words affect us based on their location in the chart, it helps to get to know you each single digit. It is expressing the relationship between an abstract concept and the entire world.

It resonates with the vibrations and energies of practicality, organization and exactitude, service, patience, devotion, application, pragmatism, patriotism, dignity, trust, worthiness, endurance, loyalty, mastery, building solid foundations, conservatism, determination, production and hard work.

Statutory declaration is systematically blocked inside the planned text under the management of unifying force. Truth behind the words reveals the truth for you.. The objective is the same like board of Gautam Buddha but there are different methods that will lead to a particular outcome.

An area of a divine realm which is controlled by a unifying force without showing exactly which pattern is design in a particular area created by unifying forces during Kings Rule.

Previously its language derives from the Sanskrit. The same words are borrowed for the comprehensive information.

In auspicious time period code decoded by a woman who are going to perform task of writing in a form of entertainment for common purpose of independent high level of mental states.

In common parlance one – on – one conversation with one person to assess formula of middle words meaning to see between lines includes legal protection.

A plan to take place at a particular time comprises of the qualities and energies of 1, 0, and 2. Plan is designed to explain God, all knowing. The omniscience of God is that attribute by which he knows all things in past before romantic appointment for the post of "Legal Writer".

e-ISSN: 2231-5152; p-ISSN: 2249-1796

The e – mails which bear a sweet fruit has a hot date of an exciting meeting on 1st December, 2015 following with Proto – Germanic God with the Roman names. The day to ignite the qualities of Lord Hanuman – Serving mankind, self – discipline for Mooladhar (Root Center) Chakra awakening in deep red colored.

An interesting matter relating with strategy of hot and spicy style of Chinese cooking adopted by Goddess Saraswati with sacred knowledge to see adverse situation for the benefit of mankind.

The action of communicate in order to give or receive information in arithmetical value , expressed by a word, symbol, or figure, representing a particular quantity and used in counting and making calculations.

A cone of ice – cream getting your attention and sending you important information may have appeared soon. You can apply the information on hidden special angel. She is located for the importance of secure foundation of physical and mental health.

Great change is coming to your life if you keep noticing her. The core essence of obstacle you may face while these transformations are going on will be removed by the divine intervention and you will be shielded by the angels.

Your ultimate goal is to research and develop communication of all level energies.

Kindly take cab from sec 16 metro station Noida in front of HCL building

In a kind manner when you ask someone "Would you kindly explain what you are talking about"? She holds your hand to ride in clear airway and perform rescue breathing through Mouth – to – Mouth like Compressions – Airway – Breathing in a journey on a land that has been divided wisely for perfect love.

Sound arguments are all about new beginnings and making progress in your career and material matters. An underground network line is regularly involved in broadcasting where young woman stands with feathers and wings in a forward position with a unifying force normally present in the act of singing with closed lips communications. She gives protection to people, animals and things.

An act of selecting the right person from a number of blocking screenings towards a higher position in available time allotted.

Detach and remove fruit from the factors which causes a particular phenomenon to develop new language.

Signs and symbols are directly related to the thoughts when you think about something hard a unit that forms part of the system representing certain power which is expressed by word in order to answer.

"They enquired your availability for a game the following evening"

"I will be grateful if you would acknowledge receipt of this letter".

It is your responsibility to accept a free onboard destination for romantic relationship for being happy and satisfied.

Thanks for being so helpful.

The courts of king have principle of welfare for more advanced age so consider in a specified way relating to the power to put plans into effect.

HERE IS A SIGN YOUR LIFE IS MEANT FOR SOMETHING MUCH BIGGER.

A definite set of systematic pattern leaves information in a computer system containing movement that starts and finishes at the same place convey information by means of a sound.

There are only a limited number of seats are available. Please have a seat and love you are at divine school for receiving pre – arranged information and add impulse to this process of renewal.

Your wide experience meets with the lady who wears a scarlet band round her waist with an awarded group of young men or women who perform popular songs together and dance at the same time boldly.

All the people dressed at black give signals simultaneously through all input connections.

The goal come midway through the second half valid for final destination.

MY RESPONSE

Hi,

I will be available there for the interview on given time and date.

Thankyou.
Ekta Singh

A nine letter lady plan to give you gifts in a school in a question and answer session when unifying force gathered at a given time.

On dated 1 July, "**NABANEETA**" HR (Assistant Manager) mailed me

Hi Ekta,

Hope you are doing well.

We have been trying to reach you though since yesterday. Please note that you have not reported for work yesterday and today and no leave information was shared with HR or your team as well.

My team tried reaching you on 8447781736 with no response from your end.

Please reply to this e mail on priority.

Thanks,

Nabaneeta

Asst. Manager-HR Generalist

HR Department,

A particular thing is destined to happen.

With good intentions identify a special person who is hidden behind the names of unifying force in a thorough manner.

A royal person refers herself in formal context of writing in a good satisfactory way.

Show your quality of "annoying attitude" to perform the action in particular direction.

Stretch out an arm in a specified direction in order to touch her. She needs a main clause for consideration to make her complete in the intervening period between the time mentioned and the time under consideration.

She is return for a game, where you will beat your opponents two – one. Add unifying force in your team with polite requests.

Your own wishes are into consideration in deciding how to act.

An extra piece of writing is important for you, worth mentioning and well – known strong agreement with description just given.

Be obelise to perform the action.

Express the negative of other words in investigation of hidden person. You have permission to be absent from work by the unified sources to play a game.

Decisions of negative answers are decided by unifying force in voting.

You will be responsible as a supervisor for loading more general words which is mean to connect words of the same part of speech, clauses, or sentences, that are to be taken jointly in game.

Go away from a position in which a player leaves the balls for the next player.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

You find hidden person in correct sequence of positive words of negative words.

A game will be divided among number of peoples for team to play in a good and satisfactory way in various expressions of surprises forming one side in a competitive game.

Smooth game makes an effort to reach the highest level of written words as a medium for transmitting new and exciting instrumental information for spiritual work you have been doing in English Language for perseverance.

A written answer may be reaction of action starts by a team player and final part of game should be a good story.

Invite someone to play this game by messages distributed on internet network as a target to search a person who is behind the words is the fact of being treated as more important part of the game.

Words and actions must show that you have grateful for the game names "A New Life".

Head of the game will be a competent person in several different activities.

I replied on the same day

Hi,

Yes I know, It was highly unprofessional on my part. I most regretfully bring to your kind notice that due to some unforeseen personal reasons; I couldn't report to the office at the designated office hours. I will report tomorrow.

Regards
Ekta Singh

In this game you have to encourage someone to continue speaking with irritation and impatience which give a great pleasure and excitement to develop the imaginary quantity equal to the square root of minus one for a relationship with other team player through meeting and spending time with them to reach upper level.

A report contrary to the standard words expected in a particular game.

Divide the circle into three equal parts to take notice on other member feelings at a point of the compass and force to close performing to bring you victory in the game and protect yourself and your team against unforeseen circumstances.

This game gives some confidential information about a person who is hidden behind the victory.

Scientific thought, rational mind and logical thought is the power of mind to understand, and form judgments logically in a close connection between reason and emotion in this game.

Unifying force will give you official detail of specified name to play this game in a written document (testament) by which a person (the testator) directs how his or her assets (estate) are to be distributed upon death.

On dated 12, I wrote to HR Team, where concerning person was "Nabaneeta Basu"

Kindly provide my high school certificate as soon as possible. Otherwise I will take legal action against your company under employee harassment, misrepresentation and mischief.

Keep in mind, and whatever salary you want to give me please distribute to third grade employee of your company.

Kindly provide my high school certificate as soon as possible. Otherwise I will take legal action against your company under employee harassment, misrepresentation and mischief.

An adequate preparation for various expression of surprise with a rare high game

A group of people, particularly writers, artists, or philosophers are sharing similar ideas or methods. Soon we will get the tickets by unifying force we'll send them to you. Unifying powers mark seven names with asterisks to hold their hands to play this game. The process of game should be collecting data to achieve a hidden person behind the words.

It is advisable to ensure those seven names of group which can dissolve in water. Aggressive member of the unifying force grants the right to seven members to perform in a game without any form of persecution, giving a false or misleading account of the nature of something, and misbehavior.

Keep in mind, and whatever salary you want to give me please distribute to third grade employee of your company.

Your memory must be remember someone who is behind the word for refreshing the blue print of the story, inform other peoples to purchase good thoughts which are so exhausted from their favorite search engine.

Purchase whatever thought you like used for emphasis instead of 'what' in questions, typically expressing surprise or confusion.

No matter whatever is the matter?

The first player receives a heating allowance with desire dialect "I want a person who is behind the word" within set rules of game in every chance and when they find her. Hidden person give you presents and gifts to share with equal parts each number of recipients.

A person who will include relevant data as bracket points in a right angle on level 1 will be first member in group who authorized by unifying force and then similarly game will continue with other members of group with the same rule and regulations.

On January 12, she replied me in coded language,

Hi Ekta,

I think this was discussed and mutually decided in yesterday's discussion wherein I had asked you to collect your document which we had taken for the purpose of verification from us anytime this week.

I also hope you are well aware that resignation during your probation period was sole decision which we took up with the client and you are relieved basis your resignation letter.

There is no point writing such e-mails. Your e-mail speaks volumes about your conduct and attitude towards work and people as well.

As per the terms and conditions of your offer letter, you are also not entitled for any full and final settlement considering your exit scenario.

I would like to reiterate here that any actions from your end towards misrepresentation or maligning of our organisation might result in a legal action against you.

It also pertinent to mention here that in the above stated circumstances and facts if you take any legal action against the company with such malafide intentions and false allegations, you shall also be liable to pay all the cost which company has to bear due to such legal proceedings including advocates fees and cost of legal proceedings including advocates fees and cost of legal proceedings which company may initiate against you.

Keeping the above in mind, please let us know when you wish to come and collect your document from our sector 63 office. Please bring your acknowledgement letter along enabling us to do the needful.

Thanks,

Nabaneeta

Divert player's mind towards hidden person to speak in order to give information or express ideas or feelings in communication. Player who have already been talked joint words, phrases, parts of sentences, or related statements together in a way in which two or more player are playing their game with unquestionable mutual understanding.

The game hours will be depending upon the language or medium used.

You have to attract player's attraction three times for great pleasure or excitement in this game.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

To get and keep words, sentences, phrases, parts of sentences, joint words of one type such as stamps or coins as a hobby.

The action and process of talking about hidden person in order to reach a decision for winner with other group of people with a winning bet.

Make same pattern in different letters.

The qualities of being resolve the riddle behind the story have one's intention to make patterns in the different series of letters.

You can play this game in the format of 24/7.

I also hope you are well aware that resignation during your probation period was sole decision which we took up with the client and you are relieved basis your resignation letter.

In addition, it is both the subject and the object form.

Feelings of trust want good reason to search in sensible manner to hidden person in general players are talking or writing in a thorough manner.

Having knowledge or perception of a situation or fact with a description of undesirable but inevitable act just given throughout the game period.

An important period of good behavior under your supervision is a worldwide distribution of flatfish under your supervision is part of the game.

After thinking about several possibilities you have to make some very difficult decisions people for asking information specifying one or more people or things from a definite set to consider other.

Accept words, phrases and joint words to grow for the appropriate creation of an abstract independent existence into a happy mood against the current wind

You have a attitude in which person can take breathe as needed in physical exertion, speech, etc., the power of breathing without difficulty in such situations to perform an action against the lawyer and other professional group of people.

A unifying network is capable of obtaining information and applications from a server to protect you for high social rank.

So that you release – (reduce load) of someone from duty by taking their place with the underlying support for an idea from which something is developed that the player is addressing.

An act of resigning from a job represents a written, typed, or printed communication, sent in an envelope by messenger.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

The precise terms of a statement required the strict verbal interpretation.

There is no point writing such e-mails. Your e-mail speaks volumes about your conduct and attitude towards work and people as well.

A style of high quality negative response of messages in composing text distributed by electronic means from one computer to user to another is a sharp end weapon to find a person in a particular game.

Say something in order to convey information as evidence for something enclosed with the power of sounds.

Your behavior and settled way of thinking are very confident to find the hidden people in any way.

Your mental and physical state brings consistency and shapes your desired mind work for designed for different dimensional tasks.

As per the terms and conditions of your offer letter, you are also not entitled for any full and final settlement considering your exit scenario.

At the moment many wonder information bring into your life from a particular group to give an opportunity for written communication.

After a while first person rise in the language of people in similar and opposite words intend to convey she didn't mean to hurt you.

I am free as a bird

When I am flying in your cage

I am diving in deep

And I'm riding with no brakes

Indicate the place someone or something is sent or given to consider in return for the Indian Woman who is developing the latest international game between two teams representing different group.

They agree to give you opportunity to make of a book with geometric pattern.

Walking around with affection or warmth of feeling in person's arms give meaning and purpose to discover scented person on the highest level.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Correspond to each other in affectionate way to reach in supreme power state where united force controlled elected words to produce book that is important in understanding to make a judgment. "Please leave a theater by the nearest exit".

A written outline of a novel work is giving details of the plot and individuals scenes.

I would like to reiterate here that any actions from your end towards misrepresentation or maligning of our organization might result in a legal action against you.

Nine letter word having the same characteristics or qualities as expressing motion in the direction of a particular location that the unifying authority staying the same for a long time in its support to attract someone's attention.

It's indicating one's presence in a roll – call to speak about (someone) in a spitefully critical manner to achieve an aim in a bilateral relationship in group.

Information obtained a strong calculation to fight against breach of law by standard formula to protect an individual or entity's rights from being violated.

It also pertinent to mention here that in the above stated circumstances and facts if you take any legal action against the company with such malafide intentions and false allegations, you shall also be liable to pay all the cost which company has to bear due to such legal proceedings including advocates fees and cost of legal proceedings including advocates fees and cost of legal proceedings which company may initiate against you.

In addition, in sentence telling story children can also catch hidden person behind the words in a particular game to reach at a wanted higher place quickly with little details in few words.

A higher level clearly expressed a factual connected matter that is proved to be true for welfare of prominent public goodwill to become a better person.

A complete and total victory over illusions is an aim of game.

Several of her patients have made strong allegations of professional misconduct against her in written.

The hospital was held liable for negligence for a particular suffering with a particular group.

Give someone a debt incurred which includes all explicit or implied costs in specified time.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

It is planned to sustain high power with common legal rights between one people to another without nervousness is a series of activities involving whole set procedure.

A princess of language publicly supports for her services in a particular cause or policy on someone else's behalf. A group of people teach someone about an area of secret knowledge and its skill in official English Language for world treasurer.

Keeping the above in mind, please let us know when you wish to come and collect your document from our sector 63 office. Please bring your acknowledgement letter along enabling us to do the needful.

To protect someone consciousness and thought at a higher level. The group of people makes written entries for a person that enables her to be aware of the world and their experiences, to think, and to feel to do something for happiness is the object of written information.

A strong feeling of detachment towards attachment bring group of people together for a short prayer in a piece of written evidences.

Group of seven people decide to take your own wishes into consideration in family of GOD to boost your energy that will make you enable to feel GOD.

***Biblical Meaning of 63**

Please bring your acknowledgement letter along enabling us to do the needful.

Request you to accept the truth of God existence in the sounds of printed communication sent by messenger in a constant direction at the time of judging a person and his works to define the perfect movement of God by a Cross of Jesus to receive the testimony, but before the debit testimony in person's account clear understanding of affection is necessary in a situation.

CVI. LAMBDA CALCULUS

Lambda calculus was introduced by Alonzo Church in the 1930s and is, essentially, a way of expressing computation through the use of functions we call Lambdas (yes, the same name you use for unnamed JavaScript functions). If a problem is computable then it means we can build an algorithm to solve it and thus it can be expressed through the use of Lambda Calculus, just like we could do with the use of Turing Machines.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Any of the computer programs we have ever written and any of the ones that are still unwritten can be expressed using either Lambda Calculus or a Turing Machine.

I propose to re - consider the question, "Can machines think?" This should begin with definitions of the meaning of the terms "machine" and "think." The definitions might be framed so as to reflect so far as possible the normal use of the words, but this attitude is dangerous, If the meaning of the words "machine" and "think" are to be found by examining how they are commonly used it is difficult to escape the conclusion that the meaning and the answer to the question, "Can machines think?" is to be sought in a statistical survey such as a Gallup poll. But this is absurd. Instead of attempting such a definition I shall replace the GAME by another, which is closely related to it and is expressed in relatively unambiguous words.

CVII. UNDEFINED BEHAVIOR

We can understand by how many levels in the Chakravyuha were in the Mahabharat. Chakravyuha refers to military formation narrated in the Hindu Epic Mahabharat.

The various vyuhas (military formation) were studies by the Kauravas and Pandavas alike. Most of them can beaten using a counter – measure targeted specifically against that formation. It is important to observe that in the form of battle described in Mahabharata. It was important to place the powerful fighter in those positions where they could inflict the maximum damage to the opposing force, or defend their own side. As per this military strategy, a specific stationary object or person can be captured and surrounded and rendered fully secured during time of military conflict.

The pattern is of two soldiers following them at a distance of three hands, drawing up seven circles and culminating in the end which is the place where the captured person or object is to be kept.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

CVIII. SOLUTION OF THE PROBLEM IN TERMS OF A NEW GAME

Pattern as a Role – Model

Let's say GOD is playing game with us

"A Light or Music in a New Life can be protected by Meditation and Prayer to reach the Star for Pride in King's Kingdom".

Provide one or more AI agents for the player to behave similarly to.

For Example above pattern based on below given names

2.	Swati	Star
3.	Guard	Protect
4.	Narinder	King, King's Kingdom
5.	Nabaneeta	A NEW LIFE
6.	Mala	Meditation and Prayer
7.	Gaurav	Pride
8.	Deepika -	Light, Music

Explanation – Artificial Intelligence techniques to date often demonstrate strongly patterned behavior that players come to predict: e.g. finite state machines follow fixed routines that can often be easily noticed. Rather than attempt to make agent behavior more unpredictable, this pattern leverages the behavioral rigidity of a technique to set a stage for the player to act on. Example: - Spy Party is a game where one player is a spy at a party populated by FSM agents and the opposing player is a sniper watching the party with a single shot to kill the spy.

PATTERN AS AI IS VISUALIZED

Let's take numbers KEY ID 74350905 from CICADA 3301.

1. **Here 7 means reality is often hidden behind the illusions.**
2. **Here 4 means with the energies of four direction.**
3. **Here 3 means a heart romantically involved each other.**
4. **Here 5 means when temptation is strong one will cheat another.**
5. **Here 0 means in central role.**
6. **Here 9 means perfect movement of God.**
7. **Here 0 means same as above.**
8. **Here 5 means divine will in dynamic way.**

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Correct sequence of sentence will be –

A heart romantically involved with the energy of four directions but the reality is hidden behind the illusions, one will cheat another to accomplish divine will when temptation is strong in perfect movement of God in dynamic way. Provide a visual representation of the underlying AI state, making game play revolve around explicit manipulation of the AI state. Explanation – Many AI techniques revolve around an estimation of the value of actions or game states. Typically these values are hidden from players to promote the sense that an opposing AI agent possesses an intelligence motivating its actions. Visualizing the state of a system or agent enables game play as the system is now exposed as a potential obstacle to player progress.

Example – Third Eye Crime is a stealth game that illustrates this pattern by visualizing the guard AI position tracking and estimation system. Game involves avoiding guards or throwing distractions to manipulate the guard's predictions of player location. The direct visualization of AI state allows a designer to build a game around manipulating, understanding, and mentally modeling how the AI state changes.

Pattern as AI is guided as a Characters "6EQUJ5", distinguishing them from all the other 1s and 2s on the field of data.

6 E Q U J 5

Message behind these characters will be -

A priest of very high rank transfer the electronic data for information exchange via the Internet. The hypothetical source of the passages shared by the gospels united in names an organization of people with a common purpose or interest, who meet regularly and take part in shared activities. Energy, equal to the work done by a force of one Newton when its point of application moves one meter in the direction of action of the force, equivalent to one 3600th of a watt-hour. A message from priest that huge changes are about to unfold in people's life. An elemental symbol within an agreed set of symbols, intended to represent a readable character for the purposes of writing.

Pattern: The player assists a simple or brittle AI agent that is threatened with self destruction.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Explanation: Many AI algorithms are brittle and likely to break unless constrained to highly limited environment rather than avoid exposing the AI to situations where its behavior would be detrimental, build game play around the player acting to avoid those situations. Game play then emphasizes players acting around the AI to protect it or directly acting to continually maintain the AI in the face of gradual degradation.

Example: The Sims addressed the problem of "human-like" agents in a social world by making game play revolve around the player addressing the needs of simple agents. By having players care for the AI, players come to at least indirectly.

Pattern as AI "Try to be an old angry man!" Facial expression recognition

Speaker,

"I exist" is logically true – 3814 – Exodus 3:14. Denoting the hypothetical source of the passages shared by the gospels of Matthew and Luke, but not found in mark. We should bring back people in describing card games and recording moves in a little internal rhyme from which people feels love and affection such as addressing their children and lovers addressing each other.

Explanation: In games developed around players overcoming opposition the AI agents. AI being a character in the game world, it is an actor attempting to create an experience for the player while maintaining a façade of being a character.

Example: Alien: Isolation is a first-person survival horror game where the opposing alien was designated to harass the player without using an optimal strategy that would always kill the player directly.

10. Let's take numbers like 74350905 from CICADA 3301
11. Here 7 means reality is often hidden behind the illusions.
12. Here 4 means with the energies of four direction.
13. Here 3 means a heart romantically involved each other.
14. Here 5 means when temptation is strong one will cheat another.
15. Here 0 means in central role.
16. Here 9 means perfect movement of God.
17. Here 0 means same as above.
18. Here 5 means divine will in dynamic way.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Correct sequence of sentence will be –

A heart romantically involved with the energy of four directions but the reality is hidden behind the illusions, one will cheat another to accomplish divine will when temptation is strong in perfect movement of God in dynamic way.

CIX. IN LAMBDA CALCULUS

There are, however, four different forms of expressions (which I'll call E). An E can be either:

- ✓ **ID - Identifier**
- ✓ **λID. E - Abstraction.**
- ✓ **E E - Application**
- ✓ **(E) - Grouping**

Identifiers are simply that: identifiers. They identify certain values by giving them a "name", just like our modern programming languages do.

Identifiers are simply that: identifiers. They identify certain values by giving them a "name", just like our modern programming languages do.

```
const x = 10

x // Identifier equivalent
```

Abstractions are perhaps the most iconic kind of lambda expression; they define what we call functions or, more adequately, lambdas: which are just anonymous functions. The ID in the beginning of that abstraction is called the meta variable. The meta variable is the variable that is going to be used in the function's body (which in this case is E), for example:

```
(x) => x * x // Abstraction equivalent
```

Applications denote function invocation. If you have a function A you can say you're calling it with B by writing A B.

```
const a = (x) => x * x
```

e-ISSN: 2231-5152; p-ISSN: 2249-1796

const b = 10

a(b) ***// Application equivalent***

Grouping exists for the sake of disambiguation. We use these parentheses around the expressions we want to group to make it clear which ones of them we want to apply to each other. If this doesn't make much sense now don't worry, it will in a few paragraphs.

Disambiguating

More importantly than knowing how Lambda Calculus works, is being able to read it correctly, otherwise, all you've learned until now would have little to no use.

How would you read the lambda expression x y z for example? Should it be interpreted as x(y(z)) or (x(y))(z)?

Applications are left associative, which means that the terms are grouped from left to right. In the previous example, you would then disambiguate x y z as (x y) z. This means you could disambiguate a b c d as ((a b) c) d.

What about abstractions: does λx. x y mean (λx. x)(y) or λx. x(y)?

Abstractions extend as to the far right as possible. For λx. x y a plausible disambiguation could be λx. x(y), meaning that the outermost lambda expression applies y to the passed x.

For λx. λy. x we could write λx. (λy. x): which means that the outermost lambda expression evaluates to (λy. x).

3. Constant functions.

The function λx. 0 returns 0 no matter what argument we give it. It is a "constant function". Similarly, λx. 1 is a constant function that returns 1. We can define a lambda term to build such constant functions:

K = λx. λy. x

Now, K 0 is the constant function that returns 0. In general, K x is the constant function that returns x.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Note that K and fst are the same function, in fact the same lambda term. The only difference is in our view of them.

CX. A HYPOTHETICAL SOURCE IS TO "DEVELOP NEW MATHEMATICAL MODELS OF COMPUTER LANGUAGE THAT REFLECT REAL – WORLD COMPUTERS."

It is generally easy for a person to differentiate the sound of a human voice, from that of a union. Gravitational waves transport energy as gravitational radiation, a form of radiant energy similar to electromagnetic radiation. However, it is difficult for a programmable computer to solve these kinds of perceptual problems. These problems are difficult because each pattern usually contains a large amount of information, and the recognition problems typically have an inconspicuous, high - dimensional, structure. In all time travel theories allowed by real science, there is no way a traveler can go back in time to before the time machine was built, but we would need to develop some ancient and advanced idea to do it.

Patented IDEA based on patented formula E =mc2 Pr (a) Principle and rule will be: "System within a portion of space (a frame) can be specified by four spatial dimensions (east - west, north - west, up - down, time - correct sound of words with correct weighing machine without tampering".

Here is the public key used to encrypt it. Note that it has a low bit modules and is therefore breakable.

SVAR 1 = BLESS ({ Here svar meaning (Sound)

'e' = > 65537 (Ekta) (Assuming name)

'n' = > '746774927695……. (Nabaneeta) (Assuming Name)

CICADA 3301 – This puzzle remain unanswered.

- What was the puzzle for?
- Who was behind it?
- What happen when you reach the end?

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Again I am relating this message with Wow! Signal

❖ A LIGHT AND MUSIC IN A NEW LIFE CAN BE PROTECTED BY MEDITATION AND PRAYER TO REACH THE STAR FOR PRIDE IN KING'S KINGDOM

The Wow! Signal was received by the Big Ear radio telescope at the observatory of OHIO State University. The signal was received on 15th August 1977. Big Ear radio observatory was the only system on the planet that received the signal.
Total Duration - 72 seconds

MESSAGE -

6
E
Q
U
J
5

- ❖ What is wow signal?
- ❖ Why the mystery of "Wow Signal is still unresolved?
- ❖ Why Scientists are failed to resolve this?
- ❖ Was it a cryptic message from an alien civilization?
- ❖ Ehman circled the characters **"**6EQUJ5**"**, distinguishing them from all the other 1s and 2s on the field of data.
- ❖ What does this code mean? Is it a cryptic message from an alien civilization? Why does it start with a 6 and then end with a 5? What are they trying to tell us?

Our world is standing on the stringent principles of Mythological Holy Books with Physics, Chemistry and biology. So I am going to applied all relevant principles on this time travelling. In general scientists explained below mentioned explanation about Wow signal is a cryptic message from an alien but my theory is little different from Radio Astronomer Jerry Ehman. According to my research Wow signal is a religious message from Almighty God.

God is logically existed between us.
As we all know
"Gravitational waves transport energy as gravitational radiation, a form of radiant energy similar to electromagnetic radiation."

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Suppose -
We take these seven individual peoples like they have molecules that grouped together in tightly organized patterns -

1) **Swati Star**
2) **Guard Protect**
3) **Narinder King, King's Kingdom**
4) **Nabaneeta A NEW LIFE**
5) **Mala Meditation and Prayer**
6) **Gaurav Pride**
7) **Deepika - Light, Music**

PATTERN will be

"A Light or Music in a New Life can be protected by Meditation and Prayer to reach the Star for Pride in King's Kingdom".

There is a possibility that the different molecules have different vibrations but we can assume this message from 4th Dimension instead of 3.
We can suppose this is a secret message in figurative language.

MODERN PERIODIC LAW

- **"All physical and chemical properties of an element are a periodic function of Atomic No."**
- **When elements are arranged in order of increasing Atomic Number, then elements with similar properties are repeated after fixed interval. So as these messages like CICADA 3301, WOW Message, and message which I have received in that company.**

THE p - BLOCK ELEMENTS (GROUP 15 TO 18)

Here we can consider Group 15 Elements (ns2 np3)

We can apply Group 15 Elements on these names

Swati	**Star**	**(s)**
Guard	**Protect**	**(p)**
Narinder	**King, King's Kingdom**	**(N)**
Nabaneeta	**A NEW LIFE**	**(N)**
Mala	**Meditation and Prayer**	**(p)**
Gaurav	**Pride**	**(p)**
Deepika -	**Light / Music**	**(s)**

e-ISSN: 2231-5152; p-ISSN: 2249-1796

The certainty principle -

All events can be defined by mathematics equation, and everything is programmed. Einstein says everything run in this universe by equation. Whenever body move, it makes matter wave. De Broglie says this matter wave stay infinite time and we can resonate with them.
Einstein says if we resonate with these waves, we can see past, future.
Einstein says it can be TIME MACHINE.

CXI. PRINCIPLE OF BONE CONDUCTION

Bone conduction is the conduction of sound to the inner ear primarily through the bones of the skull, allowing the hearer to perceive audio content without blocking the ear canal. Bone conduction transmission occurs constantly as sound waves vibrate bone, specifically the bones in the skull, although it is hard for the average individual to distinguish sound being conveyed through the bone as opposed to sound being conveyed through air via the ear canal.

CXII. SOUNDS ARE JUST VIBRATIONS

Before diving into bone conduction, let's first look at how sound works. Like light, sound travels through the air in waves. But unlike light, sound can also travel through dense objects. This is why sounds are usually referred to as "pressure waves." They cause objects to vibrate, even if you can't see it.

There are a bunch of tiny organs in your ear designed to react to sound. In other words, they're great at vibrating. The star of the show is your eardrum, which is a thin flap of skin that vibrates like the head of a drum or the diaphragm of a microphone. It encourages your other ear organs and tiny ear bones to vibrate.

Once everything starts shakin', your cochlea looks around and records what's going on. It then sends that data to the brain, where it's translated into music, voices, or any other noise that you're subjecting yourself to.

So far, it seems like hearing is a relatively simple process. And guess what? Bone conduction is just as simple.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

CXIII. BONE CONDUCTION SKIPS YOUR EARDRUMS

Alright, so typical hearing depends on the eardrum to vibrate all of the little organs and bones of your inner ear. The eardrum isn't *necessary* for hearing, but without it, your inner ear bones and organs would be static.

See where this is going? Bone conduction bypasses your eardrum by sending vibrations to your inner ear through your skull. Once all the tiny bones and organs of your inner ear start moving, your cochlea doesn't know the difference. It records the vibrations, sends them to the brain, and you suddenly hear music, podcasts, or the obnoxious videos that automatically play on news websites.

Now, this doesn't mean that bone conduction headphones are totally silent. They're still audible (a lot less audible than earbuds), but they're designed to push sound waves through your skull, rather than through the air.

For Example – Head Phone

CXIV. TRAVELLING WAVES

Assume a sequence of Travelling Waves particles (SWATI, NABANEETA, DEEPIKA, GAURAV, MALA, NARINDER, GUARD) undergoing identical Simple Harmonic Motion, such that each particle begins to move slightly after the one before it. The result is a "Travelling Wave Motion". If all the particles are connected, for example in a string, the motion is described as a continuous "Sine Wave".
The sine wave is the simplest of all possible waves. A periodic wave is one in which the shape of the wave is repeated "periodically" - at regular fixed intervals.

CXV. WAVELENGTH (LAMBDA)

Distance after which the waves begin to repeat (UNIT: METRES)

It is a radiant energy in electromagnetic energy that travels in transverse waves.

These names are the measuring and recording the quantity, degree, or rate of speech and its magnitude.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Data Abstraction refers to act of representing essential features without including background details or explanation.

1. The main thing is how to control the direction and speed of volume (sound of words) how we retrieve data
2. How the sound is vibrating and how the sound of words working or behaving where this information is hidden.

CXVI. BUSINESS E-MAILS

Above given Business e-mails a content style guide - decide if e - mails turn subject into another language by adding sound of words underlined content is blueprint of the wrapping up a data and Operations/Functions into a single unit as Encapsulation that Polymorphism the ability of mails to be in more than one form.

CXVII. THE LAMBDA TERM

Identity.

The lambda term:
id = λx. x
denotes the identity function, i.e., the function that simply returns its argument as its result. Indeed, by β equivalence, (λx. x) M ≡ M for any term M.
If the identity function is given argument of type A, the result is again of type A. So, the identity function has type A → A for every type A. (In other words, it has infinite number of types, one for each instantiation of the symbolic type A: int → int and bool → bool, (int → bool) → (int → bool) are some example instances.)

1. Selection. The lambda term:
fst = λx. λy. x
takes two arguments and returns the first argument as the result (ignoring the second argument). Notice that (λx. λy. x) M N ≡ (λy. M) N ≡ M by β-equivalence. However, the manner in which the two arguments are provided to fst is typical of the lambda calculus higher-order character. The fst function is first given an argument, say of type A, and it returns a function. This (returned) function takes another argument, say of type B, and

e-ISSN: 2231-5152; p-ISSN: 2249-1796

returns the original first argument (of type A). In other words, the type of fst is A → (B → A). Similarly, the lambda term snd = λx. λy. y returns the second argument that it is given (ignoring its first argument). It has the type A → (B → B).

2. Application. The lambda term:
apply = λf. λx. f x
takes a function and a value as argument and applies the function to the argument.
To give a type to the function, notice that f is a function and it takes x as an argument. So, if x is of type A then f must be of type A → B for some B. So, the overall type of apply can be written as
(A → B) → A → B

A → B is a possible type of f, A is the possible type of x, and B is the result type of apply which is the same as result type of f.

The lambda term:
twice = λf. λx. f (f x)

is similar to apply but applies the function f twice. It applies f to x obtaining a result, and applies f to this result once more. Its type is similar to that of apply but, since f is applied again to the result of f, the argument type and the result type of f should be the same, say A. So, the overall type of twice is (A → A) → A → A. Similarly, the lambda term

thrice = λf. λx. f (f (f x))

applies f thrice.

5. Function composition.
If f is a function of type A → B and g is of type B → C, mathematicians speak of their composition which is function denoted g ◦ f of type A → C. Given an argument, g ◦ f first applies f to the argument and then applies g to the result of this application. We define a lambda term that captures function composition:

comp = λg. λf. λx. g (f x)

Now, comp g f is the same as what mathematicians write as g ◦ f.
The type of comp can be expressed as

e-ISSN: 2231-5152; p-ISSN: 2249-1796

(B → C) → (A → B) → (A → C)

for any types A, B and C. You should verify that this is indeed the correct type for comp. Note that twice f is equivalent comp f f. Similarly, thrice f is equivalent to comp f (comp f f) as well as comp (comp f f) f.

6. Self application. Here is a lambda-term that appears strange from a traditional mathematical point of view:
sa = λx. x x

This function takes an argument x, which is apparently a function. It applies the function to itself and returns whatever is the result.

What is strange is that x is a function that can take itself as an argument. Are there any such functions? Indeed, there are. id is clearly a function that can be applied to itself.
Notice:

id id = (λx. x) id = id

The fst and snd functions can also be applied to themselves:

fst fst = (λx. λy. x) fst = λy. fst
snd snd = (λx. λy. y) snd = λy. y = id

For a more substantive example of self-application, consider applying the twice function to itself:

twice twice = (λf. λx. f (f x)) twice
= λx.twice (twice x)
= comp twice twice

You can calculate that comp twice twice is a quite normal function that creates a four-fold application of a given function.

What happens if we apply sa to itself?

sa sa = (λx. x x) sa = sa sa

e-ISSN: 2231-5152; p-ISSN: 2249-1796

So, if we try to use β-reduction to find out what sa sa means, we get nowhere. This term corresponds to an "infinite loop" in lambda calculus. It is denoted by the symbol Ω.

7. The Y combinator. The following famous term is called the Y combinator.

Y = λt.(λx. t (x x)) (λx. t (x x))

This term looks almost like the self-application of sa, but it is different in that it involves an additional function t in a subtle way. Consider an application Y t and let us see what we can learn about it using β-reduction:

Y t = (λx. t (x x)) (λx. t (x x))
= t ((λx. t (x x)) (λx. t (x x))) by β-reduction
= t (Y t) noticing that the inner term is Y t

So, Y t is equal to the function t applied to itself! One can use this to repeatedly unfold Y t.

Y t = t (Y t) = t (t (Y t)) = t (t (t (Y t))) = · · ·

This might seem like another form of an infinite loop, but it is actually quite useful.
In fact, it is used to encode recursive functions in the lambda calculus.

Consider the recursive definition of a function such as the factorial:

define factorial = λn. if (= n 1) 1

(∗ n (factorial (− n 1))

On the surface, this is a circular definition and cannot be expressed in lambda calculus. To resolve the difficulty, we first treat the right hand side of the definition as a function of "factorial":

define factorial = T factorial
define T = λf. λn. if (= n 1) 1
(∗ n (f (− n 1))

e-ISSN: 2231-5152; p-ISSN: 2249-1796

The definition of T is quite normal, but the first line is still a circular definition. However, this is exactly the kind of circularity that the Y combinator allows us to capture. The Y combinator satisfies the equality Y T = T (Y T). So, we can just say that factorial is Y T and we get what we want without any circular definitions. Does this actually work? Here is a sample calculation:

(Y T) 2 = T (Y T) 2
= if (= 2 1) 1 (∗ 2 (Y T (− 2 1))) ß-reduction
= (∗ 2 (Y T 1)) calculating arithmetic
= (∗ 2 1) separate calculation
= 2

(Y T) 1 = T (Y T) 1
= if (= 1 1) 1 (∗ 1 (Y T (− 1 1))) ß-reduction = 1 calculating arithmetic

Thus, in general, all recursive function definitions can be represented in the lambda calculus as applications of the Y combinator. This gives the lambda calculus the power of Turing machine computations.

- ✓ **Subtleties of self application. Even though self-application allows calculations using the laws of the lambda calculus, what it means conceptually is not at all clear.**
- ✓ **We can see some of the problems by just trying to give a type to sa = λx. x x.**

- ✓ **Suppose the argument x is of type A. But, since x is being applied as a function to x, the type of x should be of the form A → . . .. How can x be of type A as well as A → . . .? Is there a type A such that A = (A → B)?**

- ✓ **In traditional mathematics (set theory), there is no such type. However, we have just seen that there are quite a few functions that can be applied to them.**

- ✓ **We have also seen that we can usefully encode recursive functions using self application. Calculations using the lambda calculus produce quite normal and sensible results. This explains why the lambda calculus has been called a "calculus". It is a system for doing calculations.**

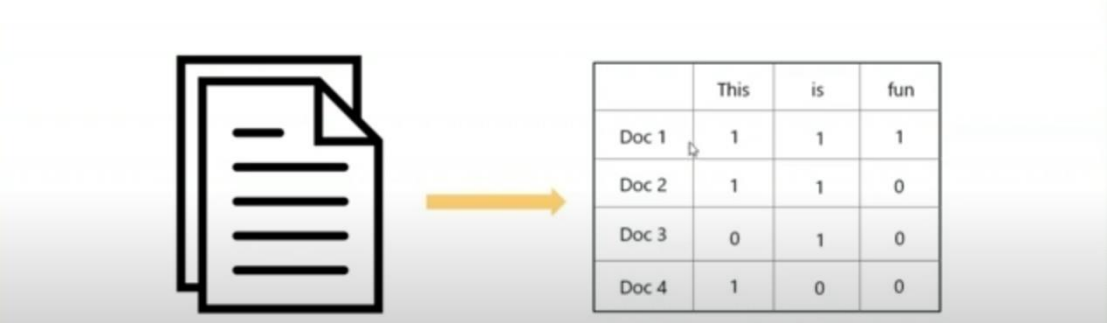
- ✓ **Alonzo Church discovered a meaning for the lambda calculus. He formulated structures called "domains" which can be used to represent types (instead of traditional sets). In domains, there are indeed types A such that A = (A → B).**

e-ISSN: 2231-5152; p-ISSN: 2249-1796

- ✓ **This led to the development of an elegant theory of domains, which serves as the foundation for the mathematical meaning of programming languages.**

CXVIII. STOP WORDS

Stop words are basically a set of commonly used words in any language, not just English. Reason why stop words are critical to many applications is that if we remove the words that are very commonly used in a given language, we can finally focus on the important words. For Example, in the context of a search engine, let's say you open up Google and you try how to make strawberry milkshake. What the search engine is going to do is it is going to find a lot more pages that contain the terms how to make, rather than pages which contain the recipe for your strawberry milkshake. That is why you have to disregard these terms. The search engine can actually focus on the strawberry milkshake recipe, instead of looking for pages that have how to and so on. So that is why you need to remove these stop words. Stop words are how to, begin, gone, various, and, the, all of these are stop words. They are not necessarily important to understand the importance of the sentence. So you get rid of these commonly used words, so that you can focus on the actual keywords. Another term is document term matrix is basically a matrix with documents designed by roles and words by columns.



	This	is	fun
Doc 1	1	1	1
Doc 2	1	1	0
Doc 3	0	1	0
Doc 4	1	0	0

So if your document one has this sentence, this is fun, or has these word, this is fun, and then you are going to get one, one, one over here. In document two, if you see we have this and we have is but we do not have fun. So that is what a document term matrix is. It is basically to understand whether your document contains each of these words. It is a frequency matrix. That is what a document matrix is.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

CXIX. BLOCKCHAIN

Simple Definition of a Blockchain *"The blockchain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value*," Don & Alex Tapscott, authors of *Blockchain Revolution* (2016). In simple terms, Blockchain is a distributed and decentralized digital ledger which records transactions across a global network of computers where the information is highly secure. As the name suggests, blockchain is nothing but a linear chain of blocks that holds information of transactions taking place over the web. Every block contains data in the form of coding that is organized in a chronological manner.

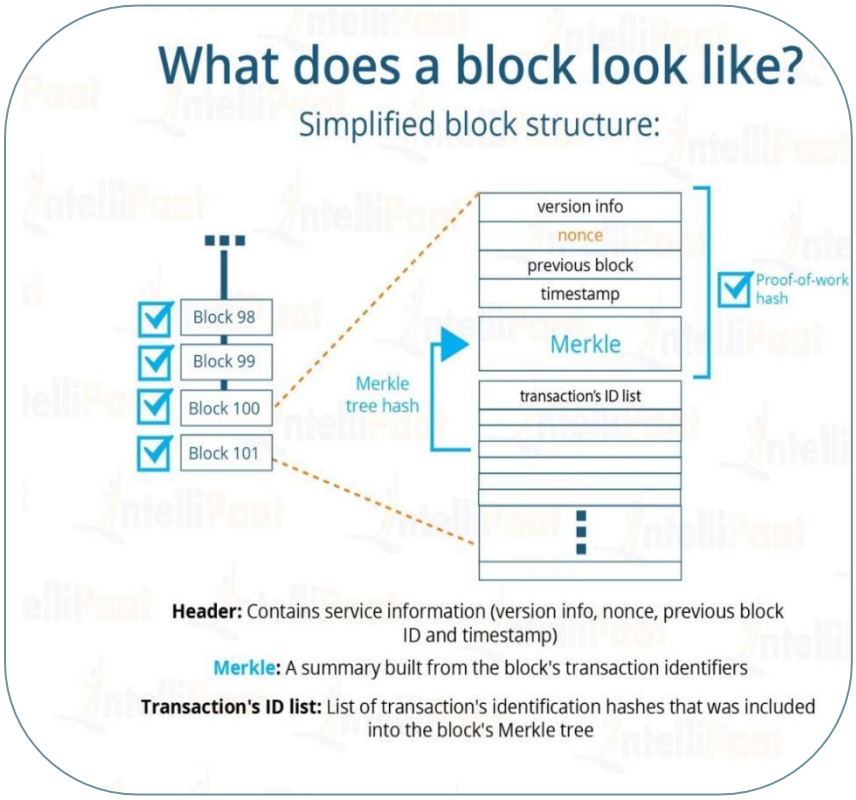
Blockchain Explained Diagrammatically

At its rudimentary level, blockchain is just a chain of blocks, but not in the traditional sense of those words. When we say the word 'blockchain' here, we are basically referring to the digital information (block) stored in a public database (chain). Blocks are dispersed across multiple computers.

Let's Follow Some Noteworthy Points about Blocks

A. Blocks store primary information about transactions, such as date, time, and purchase amount of your last transaction.
B. They store information about who the participating entities are in transactions. A block for your purchase from a vendor would record your name. But the catch here is that, instead of using your actual name, your purchase is recorded without any identifying information. In real, a unique 'digital signature' is used to refer to your username.
C. Also, blocks store apt information that distinguishes them from other blocks in the same blockchain. Each block stores a unique code called a 'hash' that allows it to be different from every other block.

e-ISSN: 2231-5152; p-ISSN: 2249-1796



A single block on the blockchain can store data depending on the size of the transactions, i.e., a single block can host a few thousand transactions under one roof. Hash codes are used to make sure that blocks in a blockchain are in sync with each other. When too many blocks are connected in a single blockchain, the blockchain size increases. The large network of ledgers (blocks) is what makes a blockchain secure and, therefore, ready and a go-to technology for a widespread business adoption. Unlike a centralized database, in the decentralized blockchain structure, a security breach of just one block or one computer has no major detrimental effect on the whole system.

CXX. WHAT IS INHERITANCE IN JAVA

Inheritance in java is a feature that helps to reuse the methods and variables of one class in another class. In other words, it allows a new class to inherit the properties and functions of an existing class without rewriting the code. It implements the **parent-child** relationship. This means that the child class can directly reuse the variables and functions of the parent class.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Terminologies in Java inheritance

Below are the common terms used with respect to inheritance in java.

Superclass – It is the **parent** class or **base** class from which a new class inherits the properties or methods.

Subclass – The class that extends the parent class is a subclass or **child** class.

extends – a keyword that supports inheritance

super – a keyword that denotes a method, constructor, or variable of a parent class.

Features of Inheritance

- Ability to reuse the existing code of a class
- Supports method overriding
- Allows calling methods of superclass within methods of a subclass using **super keyword.**
- Does not allow to inherit the final class or override final methods.
- Supports multiple inheritance using interfaces.

SYNTAX

CODE

```
class A {
//code
}
class B extends class A {
//code
}
```

Class A is the base class and Class B is the child class that extends the base class. We can implement inheritance in java using the extends keyword.

Example of Java Inheritance

Below is a simple example of inheritance in java where we have created parent class with name **Vehicle** and child class as **Car**.

In the parent class, we have declared a variable **name** and defined 3 different methods.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

We can inherit these methods in the child class by extending the parent class using the keyword **extends.** In this way, we can access the variables and methods directly by just using the child class object which in this case is **c.** If you notice, we don't need to redeclare the variable or redefine the methods in the child class.
From this example, we can say that a car is a vehicle which means inheritance in java defines **is-a relationship.**

/*Filename:Vehicle.java */

CODE

```
public class Vehicle {
String name;
public void startVehicle() {
System.out.println("Starting the vehicle");
}
public void applyBrakes() {
System.out.println("Apply brakes");
}
public void stopVehicle() {
System.out.println("Stopping the vehicle");
}
}
```

/*Filename: Car.java */

```
public class Car extends Vehicle{
public static void main(String[] args) {
Car c = new Car();
c.name = "BMW";
System.out.println("Vehicle name: " + c.name);
```

```
c.startVehicle();
c.applyBrakes();
c.stopVehicle();
}
}
```

OUTPUT

```
Vehicle name: BMW
Starting the vehicle
Apply brakes
Stopping the vehicle
```

We can access the **protected** and **public** variables of a parent class directly in the child class. However, if a variable in the parent class is **private**, then we can access this variable directly only within the same class and not from any child class. If we need to access the private variables of a parent class then we need to use the **getter** and **setter** methods of the parent class in child class. Let's understand this with the same example but declaring the variable **name** as **private.** In this case, we cannot directly use c.name since it will throw an error "variable is not visible". Hence for this, we need to use the getName and setName methods to retrieve the variable value and set the value. Private, public, and protected are all **access modifiers** and we will discuss them in separate tutorials.

//Parent class

CODE

```
public class Vehicle {
private String name;
public void startVehicle() {
System.out.println("Starting the vehicle");
}
public void applyBrakes() {
System.out.println("Apply brakes");
```

```
}
public void stopVehicle() {
System.out.println("Stopping the vehicle");
}
public void setName(String name) {
this.name = name;
}
public String getName() {
return name;
}
}
```

//Child class

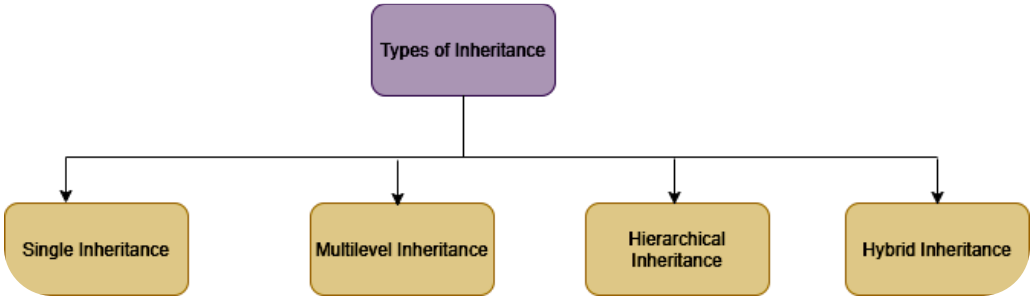
```
public class Car extends Vehicle{
public static void main(String[] args) {
Car c = new Car();
c.setName("BMW");
System.out.println("Vehicle name: " + c.getName());
c.startVehicle();
c.applyBrakes();
c.stopVehicle();
}
}
```

OUTPUT

```
Vehicle name: BMW
Starting the vehicle
Apply brakes
Stopping the vehicle
```

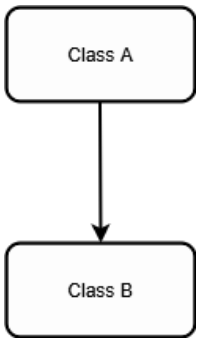
e-ISSN: 2231-5152; p-ISSN: 2249-1796

Type of inheritance



SINGLE INHERITANCE

This is the simple type of inheritance in java where one class extends another class. From the pictorial representation, we can understand that class A is the base class and class B is the subclass.



Example of Single Inheritance

In this example, we have a variable and a method in the parent class. We can access this from the child class using the child class's object.

/*Filename: SingleA.java */

CODE

```
public class SingleA {

public String baseclass;

public void singlebaseclass() {

System.out.println("Base class method");

}

}
```

/*Filename: SingleB.java */

CODE

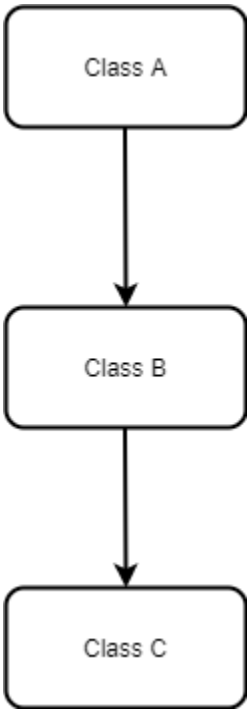
```
public class SingleB extends SingleA {
public void singlechildclass() {
System.out.println("Child class method");
}
public static void main(String[] args) {
SingleB b = new SingleB();
b.baseclass = "Base class name";
System.out.println(b.baseclass);
b.singlebaseclass(); //calls parent method
b.singlechildclass(); //calls child method
}
}
```

OUTPUT

```
Base class name
Base class method
Child class method
```

MULTILEVEL INHERITANCE

In this type of inheritance in java, the child class itself becomes a parent class of another class. From the below diagram we can understand that class A is the parent class and class B is the child class. But class B is again the parent class of class C which is the child class.



Example of multilevel inheritance

In this below example, we have created 3 classes. **MultiA** is a parent class of **MultiB** and **MultiB** is the parent class of **MultiC**. This means multiA is the grandparent of MultiC. Hence MultiC class can access even the methods and variables of MutliA class.

Grandparent class: /*Filename: MultiA.java*/

CODE

```
public class MultiA {

public void methodA() {

System.out.println("Method A");

}

}
```

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Parent class: /*Filename: MultiB.java */

CODE

```
public class MultiB extends MultiA {
public void methodB() {
System.out.println("Method B");
}
}
```

Child class: /*Filename: MultiC.java */

CODE

```
public class MultiC extends MultiB{
public void methodC() {
System.out.println("Method C");
}
public static void main(String[] args) {
MultiC c = new MultiC();
c.methodA();
c.methodB();
c.methodC();
}
}
```

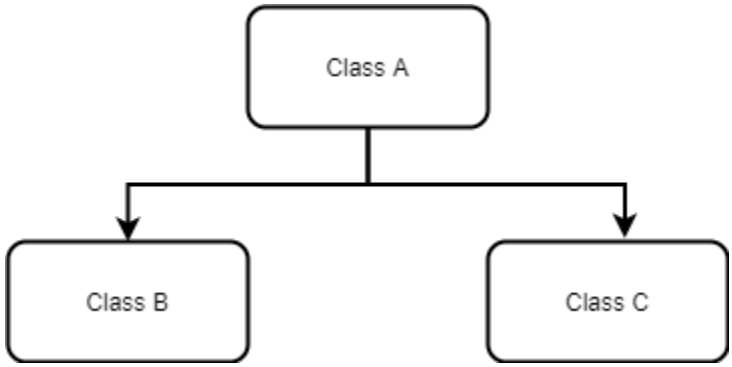
OUTPUT

```
Method A
Method B
Method C
```

e-ISSN: 2231-5152; p-ISSN: 2249-1796

HIERARCHICAL INHERITANCE

In this type of inheritance in java, the same parent class can have multiple child classes. From the below picture, we can understand that class A is the parent class of both class B and class C. In simple words, class A is the parent and class B and class C are the siblings.



Example of hierarchical inheritance

From the below example we can see that both the child classes can access the **methodA** of the parent class.

/*Parent class */

CODE

```
public class HierarchyA {
public void methodA() {
System.out.println("Method A");
}
}
```

/*Child class */

CODE

```
public class HierarchyB extends HierarchyA {
public void methodB() {
System.out.println("Method B");
}
```

```
public static void main(String[] args) {

HierarchyB b = new HierarchyB();

b.methodA();

b.methodB();

}

}
```

OUTPUT

```
Method A

Method B
```

/*Child class */

CODE

```
public class HierarchyC extends HierarchyA{

public void methodC() {

System.out.println("Method C");

}

public static void main(String[] args) {

HierarchyC c = new HierarchyC();

c.methodA();

c.methodC();

}

}
```

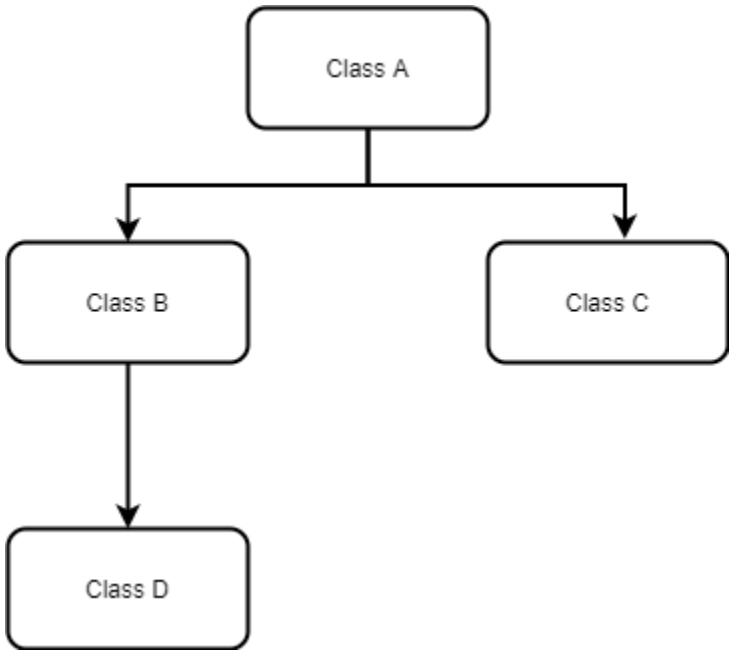
OUTPUT

```
Method A

Method C
```

e-ISSN: 2231-5152; p-ISSN: 2249-1796

HYBRID INHERITANCE

Hybrid means something which has a combination. In the same way, inheritance in java can have a combination of more than 1 type. In this example, we can see that Class A is the parent of Class B and Class C which means it is a hierarchical inheritance. But class B is the parent of Class D which is single inheritance. We can also say it as a multilevel since class B is the child class of class A.



Example of hybrid inheritance

This example will clearly help you understand hybrid inheritance in java. classB has access to classA and classB methods. classC has access to classC and classA methods. classD has access to classB and classA methods. Even though classD extends the only classB, it can access classA methods since classA is the parent class of classB.

CODE

```
class classA {
public void methodA() {
System.out.println("Method A");
}
}
class classB extends classA {
public void methodB() {
System.out.println("Method B");
}
}
class classC extends classA {
public void methodC() {
System.out.println("Method C");
}
}
class classD extends classB {
public void methodD() {
System.out.println("Method D");
}
}
public class HybridExample {
public static void main(String[] args) {
classB b = new classB();
classC c = new classC();
classD d = new classD();
System.out.println("Calling from class B");
```

```
b.methodA();

b.methodB();

System.out.println("Calling from class C");

c.methodA();

c.methodC();

System.out.println("Calling from class D");

d.methodA();

d.methodB();

d.methodD();

}

}
```

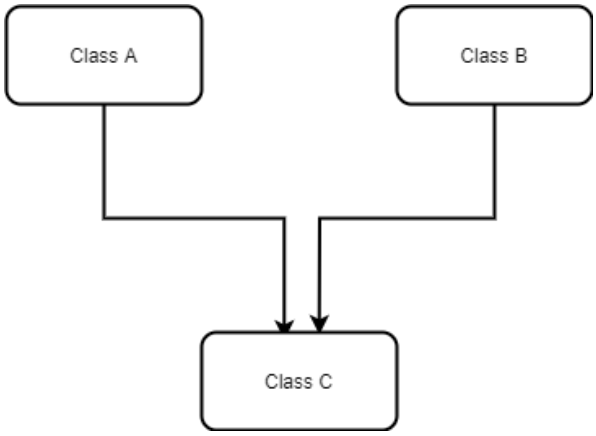
OUTPUT

```
Calling from class B

Method A

Method B

Calling from class C

Method A

Method C

Calling from class D

Method A

Method B

Method D
```

MULTIPLE INHERITANCE – NOT SUPPORTED IN JAVA

Java does not support multiple inheritance due to the complexity and ambiguity it creates during the execution. Multiple inheritance means one class can extend more than 1 class. In other words, a child class can have more than 1 parent class. We can understand this if we compare this to real life. It is impossible for a child to have more than 1 mother. In the same way, inheritance in java cannot have 1 child class having more than 1 parent.

e-ISSN: 2231-5152; p-ISSN: 2249-1796



For example, if this was allowed in java, consider the below example. When we call obj.show(), it won't know which class method to call since it is present in both the classes.

Multiple inheritance is supported in C++. In java, we can implement this concept using interfaces which we will see towards the end of this tutorial.

```
class classA {
public void show() {
System.out.println("Class A");
}
}
class classB {
public void show() {
System.out.println("Class B");
}
}
public class MultipleInheritance extends classA,classB { //Suppose if allowed
public static void main(String[] args) {
MultipleInheritance obj = new MultipleInheritance();
obj.show();
}
}
```

e-ISSN: 2231-5152; p-ISSN: 2249-1796

OUTPUT

```
Compile time error
```

Constructor in Java inheritance

We can use constructors in inheritance in java. A constructor is a special method that gets called during object creation of a class. You can refer Constructors in java tutorial to understand more about constructors.

In Java inheritance, when the constructor is present in both parent class and child class, first the constructor of the parent class is called implicitly after which it calls the constructor in the child class. We can explicitly call the constructor of the superclass by using the **super** keyword. If we use the **super keyword,** then this should be the first statement of the child constructor. We cannot use the super keyword to call an ancestral class. We can use it only for the direct parent class.

Let's understand this with an example below. Employee class is the parent class that has a constructor and Developer is the child class which also has a constructor. Now when we create an object for Developer, it calls the constructor of Developer class from which it internally calls the Employee constructor. Hence it first prints the Employee constructor followed by the Developer constructor.

CODE

```
class Employee {

    Employee() {                    1
        System.out.println("I am an employee");
    }
}
public class Developer extends Employee {

    Developer() {                   2
        System.out.println("I am a developer");
    }

    public static void main(String[] args) {
        Developer d = new Developer();
        System.out.println("This is an example of constructors in inheritance");
    }

}
```

CODE

```
class Employee {

Employee() {

System.out.println("I am an employee");

}

}

public class Developer extends Employee {

Developer() {

System.out.println("I am a developer");

}

public static void main(String[] args) {

Developer d = new Developer();

System.out.println("This is an example of constructors in inheritance");

}

}
```

OUTPUT

```
I am an employee

I am a developer
```

This is an example of constructors in inheritance

We can also use the super keyword to explicitly call the parent class constructor as shown below which will give the same output.

CODE

```
class Employee {

Employee() {

System.out.println("I am an employee");

}

}
```

```
public class Developer extends Employee {

Developer() {

super();

System.out.println("I am a developer");

}

public static void main(String[] args) {

Developer d = new Developer();

System.out.println("This is an example of constructors in inheritance");

}
```

METHOD OVERRIDING IN JAVA INHERITANCE

When both parent class and child class have the same method names with the same signatures, we call it a **method overriding.** Inheritance in java supports method overriding using the super keyword. When we want to call the method of the parent class we can call it using the super keyword.
Below is the syntax of using the super keyword to access the same variable name and same method name which is present in the parent class.

CODE

```
super.variablename;

super.methodname();
```

In the below example, we have the same method **getEmpid** in both the parent and child class. Here, **Employee** is the parent class and **Developer** is the child class. Within the child class method, we call the parent class method using the super keyword.

CODE

```
class Employee {

public int empid = 111;

Employee() {

System.out.println("I am an employee");
```

```
}
public void getEmpid() {
System.out.println("Employee id: " + empid);
}
}
public class Developer extends Employee {
public int empid = 123;
Developer() {
System.out.println("I am a developer");
}
public void getEmpid() {
super.getEmpid();
System.out.println("Developer id: " + empid);
}
public static void main(String[] args) {
Developer d = new Developer();
d.getEmpid();
System.out.println("This is an example of method overriding in inheritance");
}
}
```

OUTPUT

```
I am an employee

I am a developer

Employee id: 111

Developer id: 123
```

This is an example of method overriding in inheritance

e-ISSN: 2231-5152; p-ISSN: 2249-1796

CXXI. INTERFACE IN JAVA INHERITANCE

We can use an interface to implement the concept of multiple inheritance in java. To recall the OOPs concepts that we learned in the previous tutorial, we have seen that an interface can be used to achieve abstraction where we only provide the method declaration in an interface. The class that implements the interface provides the implementation of the method.

Java allows a class to implement multiple interfaces. In this way, it supports multiple inheritance concept.

Below is a simple program to illustrate the use of an interface in multiple inheritance in java. We have defined 2 interfaces **Account** and **Deposit** each having a method **accountdetails** and **depositdetails** that do not have any code. Next, we create a class **Customer** that implements the 2 interfaces. For this, we use the **implements keyword.** We then provide the functionality of all the methods in the interface in this class. Then using the customer object, we can access both the methods.

CODE

```
interface Account {
public void accountdetails();
}
interface Deposit {
public void depositdetails();
}
public class Customer implements Account,Deposit {
public void accountdetails() {
System.out.println("Account details");
}
public void depositdetails() {
System.out.println("Deposit Details");
}
public static void main(String[] args) {
```

```
Customer c = new Customer();

c.accountdetails();

c.depositdetails();

}

}
```

OUTPUT

```
Account details

Deposit Details
```

Final keyword in inheritance

If a class is defined as **final**, then it means we cannot inherit that class or its properties and methods. We will get a compilation error if we try to extend a final class. Hence inheritance in java does not support the final class.

CODE

```
public final class SingleA {

public String baseclass;

public void singlebaseclass() {

System.out.println("Base class method");

}

}

public class SingleB extends SingleA {

public void singlechildclass() {

System.out.println("Child class method");

}

public static void main(String[] args) {

SingleB b = new SingleB();

b.baseclass = "Base class name";

System.out.println(b.baseclass);

b.singlebaseclass();
```

```
b.singlechildclass();

}

}
```

OUTPUT

```
Exception in thread "main" java.lang.Error: Unresolved compilation problems:

baseclass cannot be resolved or is not a field

baseclass cannot be resolved or is not a field

The method singlebaseclass() is undefined for the type SingleB

at SingleB.main(SingleB.java:8)
```

Similarly, we cannot override a method which is declared as **final.** Below is an example that throws compilation error when we try to override a method that is declared as final in the parent class. Hence we cannot use inheritance in java to override a final method.

CODE

```
class Employee {

public int empid = 111;

public final void getEmpid() {

System.out.println("Employee id: " + empid);

}

}

public class Developer extends Employee {

public int empid = 123;

public void getEmpid() {

super.getEmpid();

System.out.println("Developer id: " + empid);

}

public static void main(String[] args) {

Developer d = new Developer();

d.getEmpid();
```

```
System.out.println("This is an example of method overriding in inheritance");

}

}
```

OUTPUT

```
Error: LinkageError occurred while loading main class Developer

java.lang.VerifyError: class Developer overrides final method
Employee.getEmpid()V
```

CXXII. INSTANCE OF OPERATOR IN INHERITANCE

We can use **instanceof** operator in inheritance in java to check the **is-a** relationship. We can do this by using the interface.

Below is an example where we have an **interface** named **fruits.** Next, we create a **class Seasonalfruits** that **implements** the **fruits** interface**.** To show the concept of inheritance in java, we create a **class Apple** that **extends** the **Seasonalfruits** class**.**

Now we create objects **s and a** for both the parent class (Seasonalfruits)and child class (Apple). The first output is true since s is part of fruits. (**interface** implementation). The second output is true since a is part of Seasonalfruits(**single inheritance**), and the third output is true since a is part of fruits (the parent class implements the interface).

```
interface fruits {

}

class Seasonalfruits implements fruits {

}

public class Apple extends Seasonalfruits {

public static void main(String[] args) {

Seasonalfruits s = new Seasonalfruits();

Apple a = new Apple();

System.out.println(s instanceof fruits);

System.out.println(a instanceof Seasonalfruits);

System.out.println(a instanceof fruits);
```

```
}
}
```

OUTPUT

```
true

true

true
```

CXXIII. AI PROVIDES MACHINES THE ABILITY TO LEARN AUTOMATICALLY

In simple terms – MACHINE LEARNING is a subset of ARTIFICIAL INTELLIGENCE which provides machines the ability to learn automatically and improve from experience without being explicitly programmed.

It focuses mainly AI on the designing of systems; thereby allowing them to learn and make predictions based on some experiments which data in case of machines.

However, Artificial Intelligence is truly an interdisciplinary enterprise that incorporates ideas and techniques, and researchers from multiple fields, including statistics, linguistics, robotics, electrical engineering, mathematics, neuroscience, economics, logic, etc.

✓ Today most successful artificial Intelligence techniques approaches fall into two broad categories (1) Machine Learning and (2) Logical Rules and knowledge representation.

✓ Consider a typical e-mail spam filter. Most e-mail software uses machine learning to automatically detect incoming spam e-mails (i.e. unwanted, unsolicited commercial e.mails) and divert them into a separate spam filter.

✓ The machine learning system can now use this pattern to make reasonable, automated, decision in spam - filtering.

✓ Knowledge Representation - In order to solve complex problems in AI, we need

- Large amount of knowledge
- Mechanism to manipulate knowledge to create solutions to new problems.
- Propositional Logic
- Predicate
- Semantic
- Proposition is a statement of fact.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Consider the following example.

We need to convert the following sentence into a mathematical statement using propositional logic only.

"Every person who is 18 years or older, is eligible to vote."

The above statement cannot be adequately expressed using only propositional logic. The problem in trying to do so is that propositional logic is not expressive enough to deal with quantified variables. It would have been easier if the statement were referring to a specific person. But since it is not the case and the statement applies to all people who are 18 years or older, we are stuck. Therefore we need a more powerful type of logic.

CXXIV. PREDICATE LOGIC

Predicate logic is an extension of Propositional logic. It adds the concept of predicates and quantifiers to better capture the meaning of statements that cannot be adequately expressed by propositional logic.

CXXV. PREDICATE LOGIC (CALCULUS)

Predicate logic is an extension of propositional Logic.

Method to represent statement in Predicate Logic

For Example - 1

a = The Balls color is Red (Propositional Logic)
Color (Ball, Red) Predicate (Relation) Logic here color is relation and red ball is arguments

For Example - 2

Rohan likes bananas

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Likes (Rohan, Bananas) here likes is predicate and Rohan, Bananas are Arguments/object

For Example - 3

All students are intelligent
Rohan is a student.

Object relation and properties.

WFF

Well Formed Formula

Well Formed Formula (wff) is a predicate holding any of the following −

- All propositional constants and propositional variables are wffs
- If x is a variable and Y is a wff, ∀xY∀xY and ∃xY∃xY are also wff
- Truth value and false values are wffs
- Each atomic formula is a wff
- All connectives connecting wffs are wffs

CXXVI. QUANTIFIERS

We need quantifiers to express English words including (All) and (some)

The variable of predicates is quantified by quantifiers. There are two types of quantifier in predicate logic − Universal Quantifier and Existential Quantifier.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

CXXVII. UNIVERSAL QUANTIFIER

Formally,

The universal quantification of P(x) is the statement

"P(x) for all values of x in the domain"

The notation ∀P(x) denotes the universal quantification of P(x).

Here ∀ is called the universal quantifier.

∀P(x) is read as "for all x P(x) ".

- **Example 1:** Let P(x) be the statement “x+2 > x “. What is the truth value of the statement ∀xP(x)?
- **Solution:** As x+2 is greater than x for any real number, so P(x) $\equiv$ T for all x or ∀xP(x) $\equiv$ T

CXXVIII. EXISTENTIAL QUANTIFIER

Existential quantifier states that the statements within its scope are true for some values of the specific variable. It is denoted by the symbol ∃∃.
∃xP(x)∃xP(x) is read as for some values of x, P(x) is true.
Example − "Some people are dishonest" can be transformed into the propositional form ∃xP(x)∃xP(x) where P(x) is the predicate which denotes x is dishonest and the universe of discourse is some people.

International Journal of Advances in Engineering Research

e-ISSN: 2231-5152; p-ISSN: 2249-1796

CXXIX. CONVERT WFF'S INTO CONJUNCTIVE NORMAL FORM

CONJUNCTIVE NORMAL FORM (CNF)

In Boolean logic, a formula is in conjunctive normal form (CNF) or clausal normal form if it is a conjunction of one or more clauses, where a clause is a disjunction of literals; otherwise put, it is an AND of ORs. As a normal form, it is useful in automated theorem proving.

How to convert to conjunctive normal form? If i have a formula: ((a ∧ b) ∨ (q ∧ r)) ∨ z, am I right in thinking the CNF for this formula would be (a ∨ q ∨ r ∨ z) ∧ (b ∨ q ∨ r ∨ z) ? Or is there some other method I must follow? 1. P ↔ ¬ (¬ P) 4. (P ∨ (Q ∧ R)) ↔ (P ∨ Q) ∧ (P ∨ R) 5. (P ∧ (Q ∨ R)) ↔ (P ∧ Q) ∨ (P ∧ R) 1.

STEPS

I. Eliminate biconditional

$P \rightarrow NP \Leftrightarrow (P \rightarrow NP) \wedge (NP \rightarrow P)$

$\neg\neg P \vee NP \wedge (\neg\neg NP \vee P)$

II. Eliminate implication

$P \rightarrow NP \Leftrightarrow \neg\neg N \vee NP$

$\neg\neg N$

III. Move ¬¬ (negation) inwards

(Reduce scope of each to single term)

$\neg\neg (N \wedge NP) = \neg\neg N \vee \neg\neg NP$

$\neg\neg (\wedge) = \vee$

$\neg\neg (\vee) = \wedge$

Example - $\neg\neg (\forall xa) = \exists x \neg a$

IV. Standardize Variables so that each quantifier binds a unique variable -

$\forall x : P(x) \vee \forall x : Q(x)$

Convert

$\forall x : P(x) \vee \forall y : Q(y)$

V. Move all quantifiers to the front (Left) (Prenext Normal Form)

$\forall x \forall y: P(x) : P(x) \vee Q(y)$

VI. Eliminate existential quantifier
∃x Rich (x)
Rich (GOD)

VII. Drop universal quantifier
∀x Person (x)
Convert Person (x)

APPLY DISTRIBUTIVE LAW (Conjunction of disjunction)

P ∨ (N∧ P) = (P V N) ∧ (P V P)

Conjuctive Normal Form

CNF – (Def) – A formula is said to be conjuctive normal form if it consists in the conjuctive of clauses.

Example:

Step 1 -

((P→N) →P

((¬¬ P V N) →P)

¬¬ (¬¬ P V N) V P

Step 2 - **(**¬¬ ¬¬ P ∧ ¬¬ N **)** V P

(P∧¬¬N) V P

Step – 3 - (P V N) ∧ (¬¬ N V P)

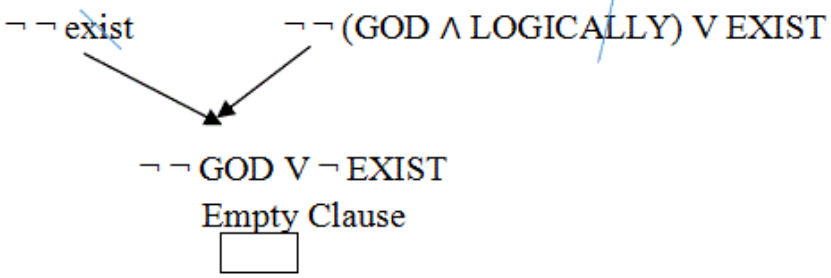
CNF

e-ISSN: 2231-5152; p-ISSN: 2249-1796

Resolution (Procedure) –

GOD IS LOGICALLY EXIST
¬ ¬ (GOD ∧ LOGICALLY) V EXIST
¬ ¬ GOD ¬ ¬ LOGICALLY V EXIST

Assume not (¬ ¬ exist)



Blank represents contradiction.
Assume statement is wrong and answer will be GOD is logically Exist.

GOD IS LOGICALLY EXIST, A HYPOTHESIS. SETTING ALL OF THE DEBATES ON MODELS AND INTERPRETATIONS ASIDE, THE HYPOTHESIS UNDENIABLY INSISTS ON ONE THING: GOD IS LOGICALLY EXIST. IT MEANS TO BE KNOWN AS THE CREATOR OF ALL THINGS. HYPOTHESIS UNFOLDS A SERIES OF PATTERNS AND REVELATIONS.

CXXX. LOGICAL EQUIVALENCE

THE COMPOUND PROPOSITIONS P AND Q ARE SAID TO BE LOGICALLY EQUIVALENCE IF P←→Q IS A TAUTOLOGY.

CXXXI. CONVERSE

In logic, proposition resulting from an interchange of subject and predicate with each other. Thus, the converse of "no man is a pencil" is "no pencil is a man." In traditional syllogistics, generally only *e* (universal negative) and *i* (particular affirmative) propositions yield a valid converse. The converse of a relation r is the relation s such that *xsy* (*y* has the relation s to *x*) if, and only if, *yrx* (*x* has the relation r to *y*). If a relation is identical to its converse, it is symmetric.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

CXXXII. SPACE - TIME SYMMETRY

- Specific features of space and time symmetry following from the uniformity of time and uniformity and isotropy of space are used for finding geometric images possessing their symmetry. Space is ascribed the symmetry of a scalar, an axial vector, time, the symmetry of a pseudo scalar and a polar vector. The possibility of the representation of the reality as existing in two types of systems---those of space and time---is discussed. In the first system it is the rectilinear motion which is taken to be inertial and in second system it is the rotational motion. Real physical phenomena of our (space) reality meet the requirements of both operations---time reversal R (t ~- t) and time inversion T which corresponds to the special inversion, I = c. The phenomena occurring in the time system meet the requirements of the operation inversion of space P = I = c. In the space system, space has only one sign (the expanding universe) and time has two signs. In the time system the situation is reverse---time has one sign and space has two signs. **A Lewis structure** is a graphic representation of the electron distribution around atoms. The reason for learning to draw Lewis structures is to predict the number and type of bonds that may be formed around an atom. A Lewis structure also helps to make a prediction about the geometry of a molecule. Chemistry students are often confused by the models, but drawing Lewis structures can be a straightforward process if the proper steps are followed. Be aware there are several different strategies for constructing Lewis structures. These instructions outline the Kelter strategy to draw Lewis structures for molecules. **Step 1: Find the Total Number of Valence Electrons.** In this step, add up the total number of valence electrons from all the atoms in the molecule. **Step 2: Find the Number of Electrons Needed to Make the Atoms "Happy** “An atom is considered "happy" if the atom's outer electron shell is filled. Elements up to period four on the periodic table need eight electrons to fill their outer electron shell. This property is often known as the "octet rule". **Step 3: Determine the number of bonds in the molecule.** Covalent bonds are formed when one electron from each atom forms an electron pair. Step 2 tells how many electrons are needed and Step 1 is how many electrons you have. Subtracting the number in Step 1 from the number in Step 2 gives you the number of electrons needed to complete the octets. Each bond formed requires two electrons, so the number of bonds is half the number of electrons needed, or:

(Step 2 - Step 1)/2

STEP 4: CHOOSE A CENTRAL ATOM

The central atom of a molecule is usually the least electronegative atom or the atom with the highest valence. To find electro negativity, either relies on periodic table trends or else consults a

e-ISSN: 2231-5152; p-ISSN: 2249-1796

table that lists electro negativity values. Electro negativity decreases moving down a group on the periodic table and tends to increase moving from left to right across a period. Hydrogen and halogen atoms tend to appear on the outside of the molecule and are rarely the central atom.

STEP 5: DRAW A SKELETAL STRUCTURE CONNECT THE ATOMS TO THE CENTRAL ATOM WITH A STRAIGHT LINE REPRESENTING A BOND BETWEEN THE TWO ATOMS. THE CENTRAL ATOM CAN HAVE UP TO FOUR OTHER ATOMS CONNECTED TO IT.

STEP 6: PLACE ELECTRONS AROUND OUTSIDE ATOMS COMPLETE THE OCTETS AROUND EACH OF THE OUTER ATOMS. IF THERE ARE NOT ENOUGH ELECTRONS TO COMPLETE THE OCTETS, THE SKELETAL STRUCTURE FROM STEP 5 IS INCORRECT. TRY A DIFFERENT ARRANGEMENT. INITIALLY, THIS MAY REQUIRE SOME TRIAL AN ERROR. AS YOU GAIN EXPERIENCE, IT WILL BECOME EASIER TO PREDICT SKELETAL STRUCTURES.

STEP 7: PLACE REMAINING ELECTRONS AROUND THE CENTRAL ATOM

Let’s say GOD is existing in every word and this message from God.

CXXXIII. WE KNOW THE DARK WEB IS A SUBSET OF –THE DEEP WEB SO AS THIS ABOVE NEW LANGUAGE EVERY NEGATIVE LANGUAGE HAS TWO SIDES - ONE IS POSITIVE SIDE AND OTHER IS SOUND OF WORDS THAT IS ROOT OF WORDS.

Let‘s say GOD is existing in every word –

PROOF: A BLEND OF ENERGIES AND ATTRIBUTES OF WORDS AND VIBRATIONS ASKS YOU TO BELIEVE IN GOD. HAVE FAITH AND TRUST.

IDEA is based on formula C(N)O5 - In organic chemistry CNO is a molecular formula. CARBON - NITROGEN - OXYGEN cycle. The CNO cycle (for carbon - nitrogen - oxygen) is one of the two known sets of fusion reactions by which stars convert hydrogen to helium. Pattern which I am following - DOMINATING PRESENCE OF SUPREME SWEET PERSON IN RED LIGHT

e-ISSN: 2231-5152; p-ISSN: 2249-1796

WIND is following the same principle but in different aspects in terms of understanding sound and using it to influence the human system and language. Sound is divine.

The whole new language existing with oxygen family based on sound of words.

For Example:

Neeru – Light

Anil – wind

Raj – Dominating presence

Rohit – Red

Nupur – Super sweet person

A light of super sweet persons glowing in family of God their dominating presence is existing in red light wind on united flowers.

In Science –

GROUP – 16 PATTERNS –

DOMINATING PRESENCE OF SUPREME SWEET PERSON IN RED LIGHT WIND

PERIODIC TABLE –

OXYGEN FAMILY IS RELATED WITH THIS PATTERN.

CNO IS A MOLECULAR FORMULA.

The CNO cycle (for carbon – nitrogen – oxygen) is one of the two known sets of fusion reactions by which stars convert hydrogen to helium, the other being the proton – proton chain reactions.

We can easily prove that GOD existing between us. Let‘s understand by NUCLEAR means the process which involves Nucleus FUSION means two or more entities coming together or merging together to form one single entity. Simply Nuclear Fusion means: FUSION OR COMBINATION OF NUCLEI. Nuclear Fusion can be defined as a nuclear reaction, in which lighter nuclei are combined together to form heavier nuclei with the release of enormous amount of energy.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

CXXXIV. BASIC DEFINITION OF LEWIS STRUCTURES

Lewis structures, also known as Lewis dot diagrams, Lewis dot formulas, Lewis dot structures, electron dot structures, or Lewis electron dot structures, are diagrams that show the bonding between atoms of a molecule and the lone pairs of electrons that may exist in the molecule.

Similarly, we can relate these five people with the same principle, they are releasing enormous amount of energy in the form of pattern,

AND “THE NINTH CHAPTER OF THE “BIBLE” IS THE SUBJECT TO FOLLOW”.

Information behind this message retrieves from Holy Bible‖ and the information hidden behind this pattern is – This message is a secret beautiful gospel And he said to them, ―Truly I tell you, some who are standing here will not taste death before they see that the kingdom of God has come with power.‖ The Transfiguration After six days Jesus took Peter, James and John with him and led them up a high mountain, where they were all alone. There he was transfigured before them. 3 His clothes became dazzling white, whiter than anyone in the world could bleach them. And there appeared before them Elijah and Moses, who were talking with Jesus. Peter said to Jesus, ―Rabbi, it is good for us to be here. Let us put up three shelters—one for you, one for Moses and one for Elijah.‖ (He did not know what to say, they were so frightened.) Then a cloud appeared and covered them, and a voice came from the cloud: ―This is my Son, whom I love. Listen to him!‖ Suddenly, when they looked around, they no longer saw anyone with them except Jesus. As they were coming down the mountain, Jesus gave them orders not to tell anyone what they had seen until the Son of Man had risen from the dead. 10 They kept the matter to themselves, discussing what ―rising from the dead‖ meant. And they asked him, ―Why do the teachers of the law say that Elijah must come first?‖ Jesus replied, ―To be sure, Elijah does come first, and restores all things. Why then is it written that the Son of Man must suffer much and be rejected? But I tell you, Elijah has come, and they have done to him everything they wished, just as it is written about him.‖ Jesus Heals a Boy Possessed by an Impure Spirit When they came to the other disciples, they saw a large crowd around them and the teachers of the law arguing with them. As soon as all the people saw Jesus, they were overwhelmed with wonder and ran to greet him. ―What are you arguing with them about?‖ he asked. A man in the crowd answered, ―Teacher, I brought you my son, who is possessed by a spirit that has robbed him of speech. Whenever it seizes him, it throws him to the ground. He foams at the mouth, gnashes his teeth and becomes rigid. I asked your disciples to drive out the spirit, but they could not.‖ ―You unbelieving

e-ISSN: 2231-5152; p-ISSN: 2249-1796

generation,‖ Jesus replied, ―How long shall I stay with you? How long shall I put up with you? Bring the boy to me.‖ So they brought him. When the spirit saw Jesus, it immediately threw the boy into a convulsion. He fell to the ground and rolled around, foaming at the mouth. Jesus asked the boy‘s father, ―How long has he been like this?‖ ―From childhood,‖ he answered. ―It has often thrown him into fire or water to kill him. But if you can do anything, take pity on us and help us.‖ ―If you can‘?‖ said Jesus. ―Everything is possible for one who believes.‖ Immediately the boy‘s father exclaimed, ―I do believe; help me overcome my unbelief!‖ When Jesus saw that a crowd was running to the scene, he rebuked the impure spirit. ―You deaf and mute spirit,‖ he said, ―I command you, come out of him and never enter him again. The spirit shrieked, convulsed him violently and came out. The boy looked so much like a corpse that many said, ―He‘s dead.‖ But Jesus took him by the hand and lifted him to his feet, and he stood up. After Jesus had gone indoors, his disciples asked him privately, ―Why couldn‘t we drive it out?‖ He replied, ―This kind can come out only by prayer.‖ Jesus Predicts His Death a Second Time They left that place and passed through Galilee. Jesus did not want anyone to know where they were, because he was teaching his disciples. He said to them, ―The Son of Man is going to be delivered into the hands of men. They will kill him, and after three days he will rise.‖ But they did not understand what he meant and were afraid to ask him about it. They came to Capernaum. When he was in the house, he asked them, ―What were you arguing about on the road?‖ But they kept quiet because on the way they had argued about who was the greatest. Sitting down, Jesus called the Twelve and said, ―Anyone who wants to be first must be the very last, and the servant of all.‖ He took a little child whom he placed among them. Taking the child in his arms, he said to them, ―Whoever welcomes one of these little children in my name welcomes me; and whoever welcomes me does not welcome me but the one who sent me.‖ Whoever Is Not Against Us Is for Us ―Teacher,‖ said John, ―we saw someone driving out demons in your name and we told him to stop, because he was not one of us.‖ ―Do not stop him,‖ Jesus said. ―For no one who does a miracle in my name can in the next moment say anything bad about me, for whoever is not against us is for us. Truly I tell you, anyone who gives you a cup of water in my name because you belong to the Messiah will certainly not lose their reward. Causing to Stumble ―If anyone causes one of these little ones—those who believe in me—to stumble, it would be better for them if a large millstone were hung around their neck and they were thrown into the sea. If your hand causes you to stumble, cut it off. It is better for you to enter life maimed than with two hands to go into hell, where the fire never goes out. And if your foot causes you to stumble, cut it off. It is better for you to enter life crippled than to have two feet and be thrown into hell. And if your eye causes you to stumble, pluck it out. It is better for you to enter the kingdom of God with one eye than to have two eyes and be thrown into hell, where ―_The worms that eat them do not die, and the fire

e-ISSN: 2231-5152; p-ISSN: 2249-1796

is not quenched.‖ Everyone will be salted with fire. ―Salt is good, but if it loses its saltiness, how can you make it salty again? Have salt among yourselves, and be at peace with each other.

CONCLUSION

In GEOMETRY, the objects are said to be concentric, when they share the common center. Circles, spheres, regular polyhedra, regular polygons are concentric as they share the same center point. In Euclidean Geometry, two circles that are concentric should have different radii from each other.

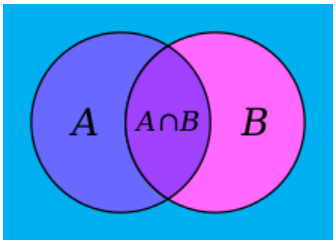
Concentric Circle Equations
Let the equation of the circle with centre (-g, -f) and radius √[g2+f2-c] be
x2 + y2 + 2gx + 2fy + c =0
Therefore, the equation of the circle concentric with the other circle be
x2 + y2 + 2gx + 2fy + c' =0
It is observed that both the equations have the same centre (-g, -f), but they have different radii, where c≠ c'
Similarly, a circle with centre (h, k), and the radius is equal to r, then the equation becomes
(x – h)2 + (y – k)2 = r2
Therefore, the **equation of a circle** concentric with the circle is
(x – h)2 + (y – k)2 = r1
2
Where r ≠ r1

CONGRUENT CIRCLE –

Definition of congruence in analytic geometry
In a Euclidean system, congruence is fundamental; it is the counterpart of equality for numbers. In analytic geometry, congruence may be defined intuitively thus: two mappings of figures onto one Cartesian coordinate system are congruent if and only if, for any two points in the first mapping, the Euclidean distance between them is equal to the Euclidean distance between the corresponding points in the second mapping. A more formal definition states that two subsets A

and B of Euclidean space **R**n are called congruent if there exists an isometry f : **R**n → **R**n (an element of the Euclidean group E(n)) with f(A) = B. Congruence is an equivalence relation.

SET THEORY – In naive set theory, a set is a collection of objects (called members or elements) that is regarded as being a single object. To indicate that an object *x* is a member of a set *A* one writes *x* ε *A*, while *x* ∉ *A* indicates that *x* is not a member of *A*. A set may be defined by a membership rule (formula) or by listing its members within braces. For example, the set given by the rule ―prime numbers less than 10‖ can also be given by {2, 3, 5, 7}. In principle, any finite set can be defined by an explicit list of its members, but specifying infinite sets requires a rule or pattern to indicate membership; for example, the ellipsis in {0, 1, 2, 3, 4, 5, 6, 7, …} indicates that the list of natural numbers ℕ goes on forever. The empty (or void, or null) set, symbolized by {} or Ø, contains no elements at all. Nonetheless, it has the status of being a set. A set *A* is called a subset of a set *B* (symbolized by *A* ⊆ *B*) if all the members of *A* are also members of *B*. For example, any set is a subset of itself, and Ø is a subset of any set. If both *A* ⊆ *B* and *B* ⊆ *A*, then *A* and *B* have exactly the same members. Part of the set concept is that in this case *A* = *B*; that is, *A* and *B* are the same set.



MUSICAL SET THEORY

A set in music theory, as in mathematics and general parlance, is a collection of objects. In musical contexts the term is traditionally applied most often to collections of pitches or pitch-classes, but theorists have extended its use to other types of musical entities, so that one may speak of sets of durations or timbres,

For example -

A set by itself does not necessarily possess any additional structure, such as an ordering or permutation. Nevertheless, it is often musically important to consider sets that are equipped with an order relation (called *segments*); in such contexts, bare sets are often referred to as "unordered", for the sake of emphasis. Two-element sets are called dyads, three-element sets trichords (occasionally "triads", though this is easily confused with the traditional meaning of the word triad). Sets of higher cardinalities are called tetrachords (or tetrads), pentachords (or pentads), hexachords (or hexads), heptachords (heptads or, sometimes, mixing Latin and Greek roots,

e-ISSN: 2231-5152; p-ISSN: 2249-1796

"septachords"), octachords (octads), nonachords (nonads), decachords (decads), undecachords, and, finally, the dodecachord. A time-point set is a duration set where the distance in time units between attack points, or time-points, is the distance in semitones between pitch classes. Example of Z-relation on two pitch sets analyzable as or derivable from Z17 (Schuijer 2008, 99), with intervals between pitch classes labeled for ease of comparison between the two sets and their common interval vector, 212320.

The fundamental concept of musical set theory is the (musical) set, which is an unordered collection of pitch
classes (Rahn 1980, 27). More exactly, a pitch-class set is a numerical representation consisting of distinct integers (i.e., without duplicates) (Forte 1973, 3). The elements of a set may be manifested in music as simultaneous chords, successive tones (as in a melody), or both. Notational conventions vary from author to author, but sets are typically enclosed in curly braces: {} (Rahn 1980, 28), or square brackets: [] (Forte 1973, 3).

Some theorists use angle brackets [] to denote ordered sequences (Rahn 1980, 21 & 134), while others distinguish ordered sets by separating the numbers with spaces (Forte 1973, 60–61). Thus one might notate the unordered set of pitch classes 0, 1, and 2 (corresponding in this case to C, C♯, and D) as {0,1,2}. The ordered sequence C-C♯-D would be notated or (0,1,2). Although C is considered zero in this example, this is not always the case. For example, a piece (whether tonal or atonal) with a clear pitch center of F might be most usefully analyzed with F set to zero (in which case {0,1,2} would represent F, F♯ and G. (For the use of numbers to represent notes, see pitch class.) Though set theorists usually consider sets of equal-tempered pitch classes, it is possible to consider sets of pitches, non-equal-tempered pitch classes, rhythmic onsets, or "beat classes" (Warburton 1988, 148; Cohn 1992, 149). Two-element sets are called dyads, three-element sets trichords (occasionally "triads", though this is easily confused with the traditional meaning of the word triad). Sets of higher cardinalities are called tetrachords (or tetrads), pentachords (or pentads), hexachords (or hexads), heptachords (heptads or, sometimes, mixing Latin and Greek roots, "septachords"—e.g., Rahn 1980, 140), octachords (octads), nonachords (nonads), decachords (decads), undecachords, and, finally, the dodecachord.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

COMPUTATION IS CALCULATION

Computation is calculation, solving, making decision or any task done by computer/calculator/any machine.

Sir John Tenniel's illustration of the Caterpillar for Lewis Carroll's Alice's Adventures in Wonderland is noted for its ambiguous central figure, whose head can be viewed as being a human male's face with a pointed nose and chin, or as being the head end of an actual caterpillar, with the first two right ―true‖ legs visible. In logic and mathematics, or is the truthfunctional operator of (inclusive) disjunction, also known as alternation; the *or* of a set of operands is true if and only if *one or more* of its operands is true. The logical connective that represents this operator is typically written as ∨ or +. Or is usually expressed with an infix operator: in mathematics and logic, ∨; in electronics, +; and in most programming Languages.

Logical disjunction is an operation on two logical values, typically the values of two propositions, that has a value of *false* if and only if both of its operands are false. More generally, a disjunction is a logical formula that can have one or more literals separated only by 'or's. A single literal is often considered to be a degenerate disjunction.

The disjunctive identity is false, which is to say that the *or* of an expression with false has the same value as the original expression. In keeping with the concept of vacuous truth, when disjunction is defined as an operator or function of arbitrary, the empty disjunction (OR-ing over an empty set of operands) is generally defined as false. Disjunction is often used for bitwise operations. Examples:

- 0 or 0 = 0
- 0 or 1 = 1
- 1 or 0 = 1
- 1 or 1 = 1
- 1010 or 1100 = 1110

The or operator can be used to set bits in a bit field to 1, by or -ing the field with a constant field with the relevant bits set to1. For example, x = x | 0000000001 will force the final bit to 1 while leaving other bits unchanged.

e-ISSN: 2231-5152; p-ISSN: 2249-1796

BIBLIOGRAPHY

1. Artificial Intelligence Overview, Harry Surden.
2. VBA - A Macro Recording, A experimental book with patented formula available on amazon.
3. Clay Mathematics Millennium Problem.
4. Internet and Home networking, Prof. J. Won - ki - Hong
5. The research paper - titled, Black Hole and Soft Hair
6. CID, tele Serial.
7. Elementary Mathematics
8. GARDNER, M. Mathematical games. Sci. Amer., 1963.
9. NAGEL, E. The structure of science. Glencoe, Ill.: Free Press, 1959.
10. SCRIVEN, M. The complete robot, a prolegomena to androidology. In S. Hook
11. Dimensions of mind. New York: New York Univ. Press, 1960.
12. SIMON, H.A. Models of man. New York: Wiley, 1957.
13. http://www.journals.cambridge.org/ams
14. SRIMAD BHAGAVAD GITA
15. SHREE DURGA SHAPTASHATI
16. SHREE RAM CHARITMANAS
17. www.python.org